Private Equity and Venture Capital Investors' Involvement in Firms Post Initial Public Offering

Natalia Matanova

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Faculty of Finance

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Supervisor: Professor Meziane Lasfer

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Declaration

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Abstract

The capital provided by private equity (PE) and venture capital (VC) investors represents an alternative type of financing available to firms in comparison to more traditional financial intermediaries such as banks, equity from owners or angel investors. These financial sponsors[1] not only provide funding, but also complete intense restructuring, improve corporate governance, align interest of managers and shareholders, provide certification and improve performance (Jensen 1986, 1989; Baker and Wruck, 1989; Baker and Gompers, 2003; Hochberg, 2012; Acharya *et al*, 2009). These investors are likely to realize their highest returns by bringing their sponsored firms to the stock market in the form of initial public offerings (IPOs). However, in practice PE and VC investors do not always exit fully at the IPO date (Celikyurt *et al*, 2014; Krishnan *et al*, 2011; Cao, 2011). They tend to maintain a block ownership in some IPOs, which allows them to remain actively involved in shaping firms' corporate policies. It is of great importance to academics, practitioners and other market participants to understand why these investors carry on investing in firms they brought to the market and whether such holdings create or destroy value.

These issues motivate my research agenda. I focus on investigating PE and VC investors' post-IPO presence in firms, their effect on corporate policies and impact on the long-run performance. In particular, the three chapters of my thesis pursue the following three distinct objectives: (i) to answer the fundamental question concerning the motivation of PE and VC investors to retain ownership in the post-IPO period and whether this retention affects the firm's aftermarket performance (ii) to examine whether PE and VC investors remain active monitoring agents and exert significant influence on various corporate policies (iii) to investigate the effect of PE and VC ownership retention on firms' cash reserves, which, as documented in previous studies, can lead to significant agency conflicts. Hence, the main objective of my thesis is to explore the extent, type and channels of private equity and venture capital investors' involvement in firms post-flotation, and its impact on the long-run performance.

To answer these research questions, I use a large sample of US and UK IPOs over the 1997 and 2010 period. In this dissertation, I differentiate and analyse separately firms backed by PE and VC investors because these investors are different in many respects, particularly since they provide capital to distinctive type of companies, as VCs invest mainly in young, growing, high-tech firms, while PE investors are likely to back high cash flow mature firms in stable industries. I provide a comparative analysis across these investors to assess whether, after controlling for these fundamental characteristics, their involvement, investment and strategies with their IPOs in the post flotation period are homogeneous. I also contrast the US and the UK markets which I found to be significantly different in terms of the composition of these two types of investors, but also the characteristics and annual distributions of IPOs.

In the first empirical study, I focus on the motivations of PE and VC funds to retain voluntarily ownership, defined as holdings outside the lockup restrictions, in the post-IPO period. I test the monitoring and signalling hypotheses, which suggest that IPOs in which VC and PE firms retain their holdings in the post-IPO period are more likely to generate higher returns because of these funds' certification and their ability to monitor companies in which they hold large stakes. I find that in contrast to UK, where both type of financing play an equally important role in bringing companies to the stock market,

[1] By 'financial sponsors' I refer to private equity and venture capital investors, who have backed firms before flotation.

the relative importance of VC-backed IPOs in the US is time varying. Moreover, the VC-backed IPOs are equally distributed across various industries in the UK, whereas VC financing is more prominent in certain industries in the US such as high-tech, telecommunications and healthcare. I find a non-monotonic (convex) relationship between financial sponsors' voluntary ownership and firm performance. Hence, in contrast to managers who become entrenched at higher levels of ownership, financial sponsors create value in companies they hold more concentrated equity stakes. More specifically, I document that financial sponsors' ownership is positively related to firm value when PE and VC investors' stake is above 1.83%. Therefore, continued involvement of financial sponsors in the post-flotation period is beneficial for the shareholders. Also, I present evidence that compulsory and voluntary financial sponsors' equity retention is used to mitigate potential managerial expropriation of outside shareholders.

I demonstrate that a different institutional framework in UK and US has a significant impact on financial sponsors' divestment extent at the IPO date and in the post-flotation period. I find that investment banks impose significantly stricter lockup restrictions (in terms of how much shares to retain) on financial sponsors involved in US backed IPOs than in UK ones. This is driven by more dispersed ownership in US companies, whose market is defined by a lower prevalence of institutional investors and the largest group of shareholders in the US being individual investors. In addition, I find that PE/VC house and underwriter reputations are only considered to be alternative commitment devices in the UK. I also highlight a number of other factors which affect voluntary ownership of PE and VC investors in the post-IPO period. In particular, I show that PE and VC fund characteristics (syndicate size, PE/VC fund's bank-affiliation and low proximity to IPO firm headquarters) partially explain compulsory and voluntary holdings of financial sponsors post-flotation. This paper extends the literature on IPOs' performance by demonstrating that financial sponsors divest fully from stronger firms at the IPO date, while commit their resources to underperforming ones in which they create value in the post-flotation period.

The second empirical study focuses on examining whether PE and VC investors create value by actively shaping IPO firms' corporate policies in the post-flotation period. In this paper I focus on three corporate policies, namely the corporate governance, as reflected in the structure of the board of directors, the investments' spending patterns, and the payout policy. These decisions are identified in prior literature to have a direct impact on firm value. I demonstrate that PE and VC investors with retained ownership continue to extensively monitor their backed IPOs. However, the two types of investors implement different monitoring approaches, which are driven by fundamentally different characteristics of the firms they finance: PE investors' ownership has a significant positive effect on the board's size, while VC investors primarily focus on the proportion of independent directors on the board of directors. Moreover, I find that the ownership structure of financial sponsors has a material impact on monitoring of portfolio firms, as IPOs backed by bank-affiliated PE funds have significantly larger boards. In terms of investment decisions, VC investors minimize expenditures in all retained IPO firms. PE sponsors' only reduce expenditures in IPOs with low proximity, so when PE investors' monitoring abilities are significantly constrained by distance and hence costs of monitoring are higher. In contrast to non-backed IPOs, I find that financially sponsored companies are more likely to initiate a payout via dividends. Since backed IPOs and matched samples are at a similar maturity stage,[2] my results imply that

[2] As demonstrated in descriptive statistics of market-to-book ratio, age and sales growth.

financial sponsors are very effective monitors because they intentionally commit firms to disgorge cash to their shareholders in the form of cash dividends in future years, as opposed to a more flexible distribution method such as share repurchase. Hence, financially sponsored IPOs represent a distinctive type of companies which initiate payouts via dividends, in contrast to non-backed IPOs which prefer share repurchases (Jain *et al*, 2009). In addition, I find that changes on the board's level indicate that in the near future other corporate policies are likely to undergo significant alterations. For example, I present evidence that firms which change the initial proportion of independent directors are significantly more likely to initiate a payout in the post-flotation period.

Moreover, I show that VC investors are able to create value in the post-flotation period by shaping certain corporate policies such as corporate governance (board size and proportion of independent directors) and capital expenditures. However, there are some dangers of continued ownership. For example, I find that in exited PE-backed IPOs capital expenditures positively affect IPO firm's value, however in retained peers this relationship is statistically negative. Moreover, I find that the firm value of retained VC IPOs which do not initiate a payout is lower than of exited peers. This finding implies that VCs withhold initiating a payout to shareholders for some private motive, which deteriorates firm value. In sum, I demonstrate that continued involvement of VC investors in the post-flotation period can be beneficial for shareholders.

The third empirical study examines the impact of PE and VC ownership retention on financially sponsored IPOs' cash reserves. I assess whether monitoring of cash holdings leads to higher long-run stock returns of backed IPOs. The paper is motivated by the rapidly increasing corporate cash reserves and the existing void in extant literature on the effect of PE and VC investors on this phenomenon. I argue that financial sponsors are incentivized to monitor cash holdings because a substantial part of their returns is not realized at the IPO date, and by retaining shares in the post-flotation period they reduce the agency costs associated with large cash holdings. I demonstrate that the proportion of assets held in cash in VC-backed IPOs is significantly larger than in PE-backed companies; this relationship holds in all industries. I find that backed IPOs with higher VC (PE) ownership concentration maintain significantly higher (lower) cash ratios post-flotation. This different effect of financial sponsors' post-IPO involvement on cash reserves is explained by fundamentally different growth opportunities of these firms. VC IPOs need sufficient internal funding to finance their growth, whereas mature PE-backed companies with higher free cash flows are more prone to agency conflicts and PE investors minimize cash reserves in these firms. I find that within retained VC sample, IPOs with higher high reserves outperform peers with low cash reserves, which implies that in order to outperform in the long-run VC firms need high cash reserves.

I demonstrate that post-IPO ownership retention by PE and VC investors mitigates the agency problems, which allows financially constrained firms to hoard cash. PE and VC syndicate characteristics have a significant impact on cash reserves. In particular, an existing relationship with an investment bank through PE funding reduces the firm's cash reserves, while more risky firms proxied by syndicate size tend to hold higher cash holdings. Moreover, I find that monitoring of cash reserves conducted by PE investors in the post-flotation period leads to positive long-run returns. Hence, the market values cash more in companies with higher post-IPO PE investors' equity ownership. I do not find a similar effect in the VC sample, which confirms that PE-backed IPOs are more prone to agency conflict and its mitigation by PE investors' monitoring is valued by the market. Overall, these results suggest that continued involvement of financial sponsors in the post-flotation period is value creating.

The three empirical studies demonstrate the channels through which financial sponsors continue to exert influence in retained firms. Overall, this dissertation presents evidence that PE and VC investors can be effective post-IPO monitors who are intensively involved in shaping firms' corporate policies, which has a positive effect on the long-run stock performance.

Chapter 1: General Introduction

Private equity (PE) and venture capital (VC) investors play a vital role in many countries. These financial sponsors provide capital, complete intense restructuring, improve governance, align the interests of managers and shareholders, provide certification, and improve innovation and performance. The academic literature provides insights into the active role these financial sponsors play when firms are under their private control (Cornelli and Karakas, 2010; Baker and Gompers, 2003; Lerner, 1995). However, little is known about the extent and type of PE and VC investors' influence and monitoring after they bring the firm to the stock market.

The capital provided by PE and VC houses represents an alternative[3] type of financing available to firms. Many countries around the world aim to foster new ventures in order to generate increased economic prosperity and boost job creation (Eberhart *et al*, 2014). In a recent study, Chemmanur and Fulghieri (2014) highlight the growing importance of financial intermediaries in fostering entrepreneurial firms in the international context. They argue that primarily two factors have led to an increased prominence of entrepreneurial finance. First, globalization facilitated cross border investments, especially in emerging nations. Moreover, these nations have established their own VC industry. Second, technological innovation which resulted in improved communication across large distances and lower associated costs.

These two investors provide, however, funding to different types of firms. More specifically, VC financing is traditionally provided at the development stage to young, growing, and high-tech affiliated firms. The majority of ventures which receive VC funding have not generated profits or sold product commercially (Fraser-Sampson,

[3] In addition to commercial banks, which are more traditional intermediaries, and other private funding from entrepreneurs and angels. Moreover, entrepreneurial finance constantly emerges with new types of financial intermediaries. For example, the share of investments funded by crowdfunding has increased in recent years.

2010). According to the joint report by PricewaterhouseCoopers and National Venture Capital Association (2013), venture capital investors made the majority of their investments in first three quarters of 2013 in the following sectors [4]: software (49%), biotechnology (13%) and IT Services (9%). Levis (2011) reports that on average VC-backed IPOs are relatively smaller, as they have 105 employees compared to 425 in PE-backed IPOs, and exhibit significantly lower net turnover. The extant literature concludes that VC investors are beneficial for portfolio firms. For example, Megginson and Weiss (1991) report that VC investors reduce information asymmetries, costs associated with going public, provide certification and increase the offering firm's net proceeds. Kerr *et al* (2014) demonstrate that angel investors are involved in efficient selection and screening, as well as have a causal impact on their investment firms' performance. Celikyurt *et al* (2014) document VC investors' ability to boost innovation and improve performance of quoted firms.

In contrast, PE investors are prone to provide financing to mature, old, large firms with high free cash flows and those concentrated in non-high-tech industries. Cao (2011) reports that 44.16% of PE-backed IPOs are concentrated in the manufacturing industry. The extant literature on the involvement of PE investors demonstrates their ability to effectively monitor, restructure corporate policies, add value and lock in profits by bringing the firms to the stock market (Krishnan *et al*, 2009; Cornelli and Karakas, 2010; Baker and Gompers, 2003; Cressy *et al*, 2007; Ritter, 2013).

Hence, private equity and venture capitalists are skilled investors, who provide financing to different types of firms and create value by means of specialized knowledge, monitoring and intense restructuring. These financial sponsors invest in fundamentally different type of firms. In this dissertation I compare across these sponsors and assess

[4]See: http://www.nvca.org/index.php?option=com_content&view=article&id=78&Itemid=102.

their ability to create value in the post-flotation period. I expect PE investors to be more successful because of their expertise in monitoring and restructuring relatively large, mature, publicly quoted firms after the acquisition.

Regardless of the different characteristics of PE- and VC-backed companies, both types of investors bring companies to the stock market, and their involvement with the newly quoted firm, through mainly their potential monitoring role, is likely to affect the wealth of the new shareholders. Moreover, there are several other reasons underlying the motivation for a deeper analysis of the PE- and VC-backed IPOs. First, such IPOs have for long constituted one of the major methods of coming to the stock market. For example, Ritter (2014) reports that the fraction of US IPOs with VC (PE) backing fluctuated from 27% to 64% (5% to 44%) during the 1996-2010 time period. However, the number of backed IPOs has reduced significantly during the recent crisis as a result of "difficult divestment environment in 2008 and 2009 – characterised by a virtually closed IPO market and almost complete absence of trade buyers" (EVCA 2010 Yearbook, p. 44). Thus, this led financial sponsors to hold on to their investments for longer. However, PE and VC firms still need to unwind their investments, and according to the Ernst and Young report (2014) there is a robust pipeline of financially sponsored IPOs in the near future as a result of improved IPO conditions, economic fundamentals and investors' confidence.

Financially sponsored IPOs represent an important phenomenon not only in the US, but also worldwide. According to the Ernst & Young Global IPO Report (2014 p.1) "PE and VC are prime drivers of IPO activity, accounting for 33% of global deal numbers; this compares to 73% of US IPOs and 26% of EMEIA IPOs." This trend is likely to continue because of the financial sponsors' need to lock in profits of investments they could not exit during the financial crisis.

In comparison to other divestment routes (secondary sale and acquisition), an IPO allows a broader set of investors to buy a company's shares, as well as the sponsors to realise the highest returns (Brau *et al*, 2003) and retain some equity after the lockup expiration. An IPO is an exit route which allows PE and VC investors to time and adjust the speed of their full exit post-flotation. Given this discretion, it is important to understand whether they bring the firm to the market at an earlier stage of its growth, and thus, they carry on holding some stakes to benefit from future growth options, or do they bring them to the market at relatively later stage, but they remain shareholders for monitoring purposes and to create value in the post-flotation period. In addition, an IPO represents a rich setting for analysis because this corporate event leads to significant change in the company's governance (Baker and Gompers, 2003), expansion of IPO firm's ownership structure to include new block holders, and increased market's scrutiny. I will assess the extent to which VC and PE ownership increases this scrutiny, and leads to better performance in the post-flotation period.

The recent 2007/2008 financial crisis has not only shifted the expected number of backed IPOs, but also highlighted the importance of alternative type of financing for small and medium-sized enterprises. To avoid financial crises in the future, regulators have decided to implement the Basel III. According to the ACCA report (2011, p 3): "The credit crunch and economic slowdown that followed it have hit smaller enterprises hard. Although Basel III is often described as a recipe for mitigating and perhaps even avoiding future financial crises, its effects on lending to small businesses are generally expected to be disproportionately negative." Hence, PE and VC investors represent an important, alternative type of financing available to firms who are were previously dependent on predominantly bank debt. However, the question remains as to whether

they are effective monitors and lead to value creation, or do they lead their sponsored firms into underperformance.

In addition, it is vital to understand whether financial sponsors' involvement in portfolio companies benefit their long-run returns from institutional investors' prospective. Asset allocations to PE and VC sectors have increased substantially, mainly because of this asset class' expected higher return potential and diversification. In a recent study, Harris *et al* (2014) report that PE funds outperformed public equities by 20-27% over a fund's life, while VCs' demonstrated superior performance (underperformance) in the 1990s (2000s). The Yale Endowment has invested 24.3% of their portfolio in this asset class in 2009, while in 2013 its allocation has increased to 32% (Yale Endowment Asset Allocation, 2013). Knowing whether PE and VC funds can create value in the post-flotation period will contribute to our understanding of this relatively new trend in asset allocation.

PE and VC funds are expected to contribute significantly to the economic development. The former target underperforming, mature firms with good potential or companies with entrenched management, while the latter provide advice and resources to young, entrepreneurial firms, which aim to reach the next development stage (Fraser-Sampson, 2010). For example, Harris *et al* (2005) report that PE sponsors substantially improve firms' productivity by reducing the labour intensity of productivity. They conclude that PE investors are successful in reducing agency costs and improving economic efficiency of portfolio firms. Similarly, VCs are known to spur innovation in mature companies (Celikyurt *et al*, 2014). Hence, it is important to understand what corporate policies are under VC and PE investors' influence in the post-flotation period and whether it results in value creation in the long-run.

The goal of this dissertation is to extent the literature on the PE and VC investors' involvement in IPOs they backed. I use a sample of US and UK IPOs over the 1997 and 2010 period.[5] In each country, I consider quotations on the main (NYSE and Main) and secondary markets (Nasdaq and AIM). The two countries are major players in PE and VC industries in terms of fundraising, investments and exits. According to the recent Preqin report (2014), PE funds in the US (Europe) raised $266.2 billion ($104.4 billion) in 2013. In the UK, fundraising in 2013 represents a substantial recovery from the crisis (Batica, 2013): "$51.7 billion raised .. is 84% increase on the $28.1 billion that was raised by UK general partners (GPs) in the previous year." From the investors perspective, target allocations to private equity is projected to increase in 2014 (Preqin report, 2014b).

I focus on the US and UK markets to assess whether PE and VC investors exhibit divergent signalling, monitoring and exit styles as a result of the different markets' frameworks. Despite a significantly larger PE and VC sample in the US, the UK market is of paramount importance to the private equity industry. In 2013, the United Kingdom and Ireland markets accounted for about 27% of all private equity investments in Europe, as well as experienced an increase in IPO exits in terms of amount at cost and number of companies (EVCA, 2013). On the global scale, the European IPO market has gained significant importance after exceeding US IPO volume in 2000 (Ritter, 2003). Moreover, UK and US are the only two countries which succeeded in developing markets for smaller, young companies (Ritter, 2003 p.2).

Despite the common 'Anglo-Saxon' model of corporate governance, which emphasizes shareholders' interests, there are significant differences between the two markets. Firstly, US companies, on average, are faced with higher possibility of agency

[5] US and UK IPOs are used in the first empirical study, whereas only US IPOs are considered in the second and third papers of this dissertation because of data availability.

conflicts, CEO entrenchment and reduced monitoring ability of the boards as a result of the wide-spread practise of the dual role of CEO and Chairman of the board. In contrast to only 40% of US firms which split the role, 94% of UK companies did so in 2010 (Davis, 2011). Secondly, on average, there is a higher level of information asymmetry in the UK market in comparison to the US, which oblige to disclose important news and information to all market participants at the same time. Stock market observers in the UK identify an unequal information access by private and institutional investors (Stokopedia, 2011). These two differences imply different levels of information asymmetries and potential of agency conflicts in the two markets.

In addition, US and UK have different institutional frameworks. Faccio and Lasfer (1999) summarize the four main differences as follows: institutional (individual) investors are the largest category of shareholders in UK (US); in contrast to UK, there are legal stock ownership restrictions in the US; 13D filing requirements in the US result in higher legal barriers against activism; and the prevalence (absence) of informal institutional coalitions in UK (US). Provided divergent corporate governance practises and institutional frameworks in the US and UK, it is important to examine whether the market of quotation affects divestment, ownership retention dynamics and post-IPO monitoring of financial sponsors.

More research is highly warranted in this area because both markets are likely to experience continued PE and VC firms' divestments via an IPO exit route because of the post-crisis improved economic fundamentals and the need to make distributions to limited partners (LPs). Cao (2011) reports that the average restructuring duration in the US (between 1997 and 2006) fluctuated between 1.39 and 6.74 years. Levis (2011) documents that on average VC (PE) investors spend 4.5 (3.7) years restructuring investment companies. However, general partners (GPs) are under a greater pressing

need to lock in their profits and make distributions to their limited partners given the recently longer holding periods caused by a difficult exit environment during the 2007/2008 financial crisis. Hence, deeper understanding of financial sponsors' divestment dynamics in US and UK is highly warranted.

This dissertation is structured in such a manner that each empirical study can be read separately, partly because of the university requirements to have three publishable separate papers, even though they all contribute to understanding of PE and VC investors' motivation to retain shares post-flotation, and its impact on corporate policies as well as the aftermarket performance. The rest of the introduction provides an overview, motivation, research questions, data and results of the three empirical papers.

1.1 Overview of the Empirical Papers

1. 1. 1 Paper 1 "Why do PE and VC Firms Retain Ownership after the Initial Public Offering?"

A) Theoretical Setting

Prior literature has established that private equity and venture capital investors conduct restructuring and various value-adding activities following their initial financing round. Jensen (1986, 1989) argues that leverage, close monitoring, and managers' expertise represent the core value drivers of private equity deals. Previous studies identify leverage to be the main value driver in PE deals because it significantly reduces the cost of capital and results in cost-efficient financing (Shivdasani and Zak, 2007; Acharya *et al*, 2010; Levis, 2011). Recently, Sorensen *et al* (2014) report that the use of leverage in PE deals reduces the private equity investors' (called limited partners, 'LPs') break-even alpha and costs.

In addition, other changes implemented by PE sponsors while portfolio companies are under their private ownership are known to improve the investment firm's

performance. PE investors replace the existing CEO, as well as alter the board of directors' size and composition (Cornelli and Karakas, 2010). Acharya *et al* (2009) report that UK public firms have on average 11.4 members on the board, in contrast to PE-backed companies' boards which are much more collaborative due to their significantly smaller size of 7-8 members. Baker and Wruck (1989) report that PE sponsors improve operating performance by linking managers' compensation plans to the firm's performance by means of stock options, and decentralisation of the decision making process. Stock options and stock grants are used to align interest of managers with those of shareholders (Jensen, 1986).

VC investors also restructure firms following their financing. Venture capitalists with prior business experience are intensively involved in fundraising and management recruiting (Botazzi *et al*, 2008). Kaplan *et al* (2009) examine the portfolio firms' evolution from business plan to an IPO. They find that VCs frequently change the management team, while they keep the business lines unchanged. Financial sponsors provide intensive oversight of their portfolio firms by VC investors' representation on the board of directors (Lerner, 1995) and appointment of a higher proportion of independent directors (Baker and Gompers, 2003; Hochberg, 2003). Because of their significant involvement in firms' operations, some firms even have to relocate to be nearer the VC headquarters before getting funding in order to facilitate monitoring (Tian, 2011). Overall, VC-backed firms are associated with increased R&D intensity, improved innovation output (Celikyurt *et al*, 2014) and more valuable patents (Kortum and Lerner, 2000). In sum, PE and VC investors' involvement results in better stock returns: financially sponsored IPOs outperform non-backed peers in the long-run (Ritter, 2013; Levis, 2011).

Previous studies (Barry *et al*, 1990; Cao 2011) document that VC and PE investors only realise a part of their returns at the IPO date. At the time of quotation, pre-IPO investors are limited in their ability to sell their shares for a certain period of time under the lock-in (or lockup) agreements. After the lockup expiration date, financial sponsors are able to either fully divest or retain some equity. The average duration of lock-up agreements in the US is 180 days (Brav and Gompers, 2003). Cao (2011) reports that one year after the quotation PE investors retain 32.36% of the firm's outstanding shares. Various financial sponsors have different preferences towards share retention. For example, lead VC members hold more shares in the pre- and post-flotation than non-lead syndicate members (Lin and Smith, 1998). Krishnan *et al* (2011) report that more reputable VC houses carry on holding more shares and have a higher proportion of board directorships three years post-flotation than less reputable VCs.

There are several studies which analyse the determinants of PE and VC investors' speed of exit. Cao (2011) reports that there is a negative relationship between the restructuring duration by PE investors and hot IPO market conditions, in addition to certain firm's characteristics, such as cash flows and stock valuations. Paeglis and Veeren (2013) consider the speed and consequences of VC exits. They find that VC investors exit faster from IPOs with intermediate founder ownership. Around the VC exit event, these firms experience the largest decrease in firm value. They explain this by higher level of founders' entrenchment post VC exit.

However, the fundamental reason behind financial sponsors' voluntary equity retention is still unknown. The first paper of this dissertation contributes to the literature by examining the determinants of such holdings, as well as their impact on the share price performance. To answer these questions, I define voluntary ownership as any holding not subject to the lockup restrictions, i.e., if the IPO did not have any lockup, if

the ownership is after the lockup expiry date, or if it is above the lockup agreement requirements. Any shares held by PE and VC investors to comply with the lockup agreement specifications are referred to as compulsory ownership. I develop and test two main hypotheses: signalling and commitment. These two hypotheses suggest that IPOs in which VC and PE firms retain their holdings in the post-IPO period are more likely to generate higher returns because of these funds' certification and their ability to monitor companies in which they hold large stakes. PE and VC investors are incentivized to monitor firms post-flotation because a large proportion of their returns is not realized at the IPO date, and their final return is dependent on the firm's share price at the time of their full exit.

The signalling hypothesis states that in financial markets with imperfections (e.g. information asymmetries), financial sponsors could use post-IPO voluntary ownership as a signal of the firm's future great prospects, thereby conveying to the market the firm's true value (Leland and Pyle, 1977). The commitment hypothesis suggests that PE and VC investors' post-IPO shares are used to mitigate outside shareholders' concern of managerial expropriation of private benefits.

B) Empirical Results

To test these hypotheses, I use a sample of 1346 US and 327 UK financially sponsored IPOs over the 1997 and 2010 period. I find that PE and VC investors are effective monitoring agents of firms in the post-IPO period. I demonstrate that financial sponsors exit fully financially strong firms, while they commit their resources and retain ownership in underperforming IPOs. In these firms, I report a convex relationship between firm value (market-adjusted BHARs) and financial sponsors' voluntary holdings post-IPO. Hence, retained IPOs with higher PE and VC equity ownership generate more

value in the aftermarket. The results based on the four factor model suggest that backed IPOs underperform in the long-run, irrespective of whether financial sponsors choose to retain ownership in the post-IPO period. Overall, my results provides support for the commitment hypothesis and reject the signalling hypothesis.

The comparative analysis between the UK and US indicates that the market of flotation has significant implications for financial sponsors' divestment strategy in the post-flotation period. I find that PE investors involved in US IPOs are obliged to maintain a significantly higher ownership immediately post-flotation, which is explained by the different institutional frameworks in the two geographic markets of quotation. In addition, underwriter and PE/VC house's reputation are considered to be alternative commitment devices only in the UK. In terms of voluntary ownership retention, I document that a portfolio firm's good operating performance enables PE and VC investors to exit fully US firms at the lockup expiration.

My results have several important implications for investors in private equity, general partners, shareholders and the market. This paper demonstrates that PE investors retain higher ownership concentrations (compulsory and voluntary) than VC peers in the post-IPO period, which is explained by their divergent strategies and ability to add value to mature public firms. This evidence has important implications for interpretations of the extant literature on the success of VC investors in providing value-adding expertise to mature firms. VC investors' ability to create value in mature firms could only be associated with a specific set of policies.

Second, limited partners should be aware of significant heterogeneity in financial sponsors' divestment behavior within different institutional frameworks, which directly influences the speed of divestment. For example, in US quoted firms financial sponsors are required to retain a significantly higher ownership concentrations in the post-flotation

period than in UK firms, which delays the distributions to LPs. Hence, the results provide a great incentive for limited partners to choose carefully the PE and VC houses they invest in based on how long they are willing to wait to start realizing returns.

Third, general partners of funds which are close to the termination date should consider carefully the market of flotation of their portfolio firm because it affects the strictness of lockup restrictions applicable to PE and VC investors. Lastly, my first empirical study contributes to the existing literature by reporting that the ownership structure of backed IPOs has an important influence on corporate value regardless of managers' ownership position, which is used to align the interest of shareholders and managers.

1.1.2 Paper 2: "Are Corporate Policies Affected by the Continued Presence of PE and VC Investors Post-IPO"

A) Theoretical Setting

Prior literature documents the specific changes financial sponsors carry out in investment firms when they are under PE and VC investors' private control. Numerous studies indicate that financial sponsors are sophisticated investors with specialized knowledge, who are able to create value in portfolio companies. Cressy *et al* (2007) demonstrate that PE firm's industry specialization alone adds 8.5% to the portfolio firm's performance. Pre-IPO PE/VC financing provides certification (Megginson and Weiss, 1991) and monitoring (Jensen 1986, 1989), improves corporate governance (Baker and Gompers, 2003; Hochberg, 2003) and innovation (Celikyurt *et al*, 2014), which result in better aftermarket performance in comparison to non-backed firms (Levis, 2011).

However, a very limited number of studies examine financial sponsors' *post-IPO* involvement and its impact on a portfolio firm's corporate policies. Celikyurt *et al* (2014) document that the representation of VCs on the board of directors has a significant

impact on mature firms' innovation. They analyse only one type of influence mechanism, board representation. Cronqvist and Fahlenbrach (2009) investigate block holders' effects on corporate policies. In LBO firms sub-sample, the authors report significant block holder fixed effects related to capital expenditures, leverage, and cash reserves; while in VC firms sub-sample, the significant effects are related to investment, R&D, and cash holdings. Hence, financial sponsors play an important role in shaping firms' corporate policies.

One main question that arises is whether these pre-IPO investors play an active role in shaping firm's corporate policies even in the post-flotation period. I, therefore, focus on PE and VC ownership retention's impact on the evolution of the board of directors, spending patterns and payout policies during the post-flotation period. These particular policies are examined because the extant literature documents their direct, material impact on firm value. Yermack (1996) reports that companies with smaller board of directors have higher Tobin's Q suggesting that smaller boards are more effective. Harford and Kolasinski (2010) report that PE investors reduce portfolio firms' overinvestments. Jensen and Meckling (1976) argue that cash can be misused by managers for their private benefits such as empire building, excessive compensation and perquisites consumption. Hence, unnecessary acquisition and capital expenditures could be a sign of empire building and waste of cash, which, instead, can be distributed to shareholders in the form of dividends and share repurchases. Lastly, payouts to shareholders are important since they contribute to shareholders' return on investment, which are especially important at times of low capital gains. Hence, I consider these policies because prior literature has documented that they are subject to intense financial sponsors' restructuring (Baker and Gompers, 2003; Celikyurt *et al*, 2014), they are inter-linked and have a significant impact on the firm value.

A high proportion of PE and VC investors' returns is not realized at the IPO date (Barry *et al*, 1990; Cao, 2011). Generation of high returns is critical for financial sponsors because their performance represents a measure of track record (Fleming, 2010), which, in turn, is linked to future fundraising (Gompers and Lerner, 1997). Hence, financial sponsors are likely to demonstrate an active monitoring of firms' corporate policies in the post-IPO period in order to maximize their final return. This is particularly beneficial for shareholders of companies in which managers may aim to maximize their own interests rather than those of shareholders. In this case, the presence of PE and VC funds in the post-flotation period will mitigate this problem. In contrast to prior studies, which examine the impact of pre-IPO PE and VC investors' involvement on firms' policies (Baker and Gompers, 2003; Lerner, 1995), I investigate the relationship between financial sponsors' *post*-IPO voluntary ownership and the evolution of corporate policies in the post-flotation period.

In this second empirical study, I aim to answer the following two fundamental questions: a) Do pre-IPO financial sponsors play important and active roles in defining firms' corporate policies in the post-flotation period? b) Does this post-IPO involvement create or destroy value? Baker and Gompers (2003 p. 570) argue that "Because existing shareholders bear the cost of suboptimal governance, board structure is more likely to be chosen optimally at the time of the IPO." Yermack (1996) documents that the board's size has a direct impact on firm value. Therefore, I expect financial sponsors to have a significant impact on the portfolio firm boards' structure in the post-flotation period. I argue that as a result of difference fundamental characteristics of PE and VC portfolio firms, I expect the roles of these two financial sponsors to differ. I expect PE investors to primarily shape the size of the board of directors, while VC investors to focus on the proportion of independent directors. By doing so, PE investors would reduce the high

agency conflicts of their portfolio firms, while VC would reduce the information asymmetries.

Due to the mature stage of PE-backed companies and high free cash flows, these firms have limited growth opportunities and high potential for negative NPV projects. These firms are subject to overinvestment and asset substitution problems. Hence, I argue that there is a high need for PE investors' post-IPO monitoring of expenditures, and PE investors are likely to minimize any wasteful expenditures. In contrast, VC-backed firms are young firms which need financing to fund their high growth opportunities. In these firms, resources are less likely to be misused but rather invested in its growth. Therefore, I do not expect VC investors to actively shape firms' expenditures in the post-flotation period.

Grinstein and Michaely (2005) find little evidence that an increase in institutional ownership leads to a boost in dividends and share repurchases. Moreover, Jain *et al* (2009 p.1275) state that "Initial public offering firms typically go public on the promise of growth thereby conditioning investors to expect capital gains rather than dividends or share repurchases during the post-IPO phase." Generation of capital gains is even more important for backed IPOs because a dividend payment might be misinterpreted by market participants as either a way for financial sponsors to boost their own return[6] or a signal of firm's maturity (Grullon *et al*, 2002), while a share repurchase initiation might signal a portfolio company's undervaluation (Jagannathan *et al*, 2000). Hence, I expect to find a negative relationship between financial sponsors' ownership retention and the propensity to initiate a payout post-flotation ceteris paribus. In case a backed IPO initiates a payout, I argue that it is likely to buy back shares, which is a more flexible

[6] For example, BC Partners increased Phone's 4U portfolio firm' debt in order to pay themselves a special dividend, which ultimately allowed the financial sponsors to recoup its original investment and make a return. However, this action was detrimental to the success of the company in the long-run (Ford, 2014).

payout method and does not have a bad stigma attached to it as dividends in financially sponsored companies.

B) Empirical Results

I use a sample of 381 PE-backed, 699 VC-backed and 505 non-sponsored IPOs to assess the extent to which financial sponsors are involved in shaping corporate policies in the post-quotation period. I find that PE and VC sponsors, who retain equity ownership voluntarily, continue to intensively monitor their sponsored firms in the post-flotation period, but in different ways. While the former tends to increase the board's size, which is shown in previous studies to exacerbate the agency conflicts (Yermack, 1996), VC firms appear to increase the proportion of independent directors, which is likely to improve governance and create value. Interestingly, I find that the previously reported inverse relationship between Tobin's Q and board size (Yermack, 1996) does not uniformly hold in all companies: board size and the proportion of independent directors have a significant positive impact on firm value of VC backed-IPOs with voluntary VC ownership. In contrast, I do not find support for the notion that PE investors, by increasing the board size, are able to create value in the long-run. However, the increase in board size is observed mainly in IPOs backed by bank-affiliated PE investors.

I find that retained VC firms spend significantly less on capital and acquisition expenditures than exited peers. Moreover, IPOs backed by PE funds which are constrained in their monitoring ability (i.e. located in another country than IPO firm), exhibit significantly lower capital expenditures.

I document that post-IPO corporate policies' changes originate at the board of directors' level and spread to other firm's operations. I show that companies which have

recently undergone a major change on the board level are more likely to initiate a payout to their shareholders.

To divide firms into dividend initiating and share repurchase initiating firms, I consider the first post-IPO payout distribution method. I find 102 dividend initiating firms, while 36 firms initiated a payout by a share repurchase, and the vast majority (1447 firms) are non-payout initiators. The analysis of payout distribution methods suggests that backed IPOs are more likely to initiate a cash dividend than a share repurchase, in comparison to non-backed peers. Since cash dividends commit firms to disgorge cash to their shareholders in future years, while share repurchases are more flexible, my results imply that financial sponsors are very effective monitors.

In general, the market is sceptical of payments of special dividends by financially sponsored companies, which is claimed to be widespread (Thomas, 2014). Special dividends are regarded to solely benefit financial sponsors at the expense of other shareholders and the company's future performance. I find that almost as many non-backed IPOs paid a special dividend as financially sponsored companies. More specifically, 13 non-backed and 14 backed IPOs (of which 5 VC and 9 PE). Hence, my finding is consistent with Harford and Kolasinski (2010) who document that special dividends are very rare in PE sample and not associated with future investment company distress.

Overall, I present evidence that VC, unlike PE, investors are able to create value by shaping corporate policies in the post-flotation period. They do so by aiming at an optimal size of the board of directors, with a good proportion of independent directors. Also, VC portfolio firms' capital expenditures contribute positively to firm value. However, the continued presence of financial sponsors after the initial public offering is not always beneficial in US backed IPOs. For example, capital expenditures are value

destroying in retained PE-backed firms, while venture capitalists' inclination to withhold initiating a payout to shareholders is driven by some private motives which are value destroying.

The results have important implications for interpretations of prior studies which investigate and link the evolution of corporate policies to firm's maturity and public quotation. The extant literature should be interpreted with caution since the evolution of corporate policies also reflects the effect of financial sponsors' continued presence, who exert significant influence and continue to actively shape them. Hence, ownership structure and the presence of pre-IPO major shareholders in the post-IPO period should be considered. Second, potential investors in backed IPOs should be aware of the great influence financial sponsors continue to exert in the post-IPO period despite having other block holders of the firm's shares. Third, the market should acknowledge that PE and VC investors are catalysts of good corporate governance, which create value in firms they retain ownership in after the IPO. Financial sponsors continue to optimize and shape the firm's board structures post-IPO. The same applies to spending patterns, which financial sponsors oversee and minimize potentially wasteful spending.

Fourth, in situations when monitoring abilities of financial sponsors are constrained by distance, other block holders should become more involved in shaping the firm's policies. Moreover, there is no perfect, universal monitoring style. PE and VC funds, as any other types of investors, have their own distinctive monitoring styles. For example, bank-affiliated funds force their portfolio firms to have larger boards. While, financially sponsored companies which significantly alter the board's features (i.e. proportion of independent directors) are significantly more likely to modify other corporate policies. Overall, this paper demonstrates the channels through which financial

sponsors continue to exert influence and create value in financially sponsored retained firms.

1.1.3 Paper 3: "Do PE and VC Firms Monitor Cash Reserves post-IPO?"

A) Theoretical Setting

The phenomenon of ballooning corporate cash holdings has drawn attention of practitioners and academics in the recent years. Bates *et al* (2009) report that the average cash ratio of 10.5% in 1980 increased to 23.2% in 2006 in the United States. The extent of escalating cash reserves is highlighted in a recent *Financial Times* article, which reports that just five companies (Apple, Microsoft, Google, Verizon Comm. and Samsung) hold $387 billion of cash, which is equivalent to United Arab Emirates' GDP in 2013 (Sakoui, 2014). Recently, some major US technology corporations (e.g. Apple) have been under attack to disgorge cash in the form of dividend payments to their shareholders: “The 20 largest US companies in this sector, many of which are averse to making big investor distributions, are sitting on close to $500bn of cash and investments" (Bradshaw, 2014).

The finance literature has identified four primary motives for corporate cash reserves: transaction (Opler *et al*, 1999), precautionary (Baumol, 1952), tax (Foley *et al*, 2007) and agency conflicts (Jensen, 1986). There are a number of known drawbacks associated with high cash reserves. Jensen (1986) argues that entrenched managers are more likely to retain cash instead of making payments to shareholders. Cash represents a part of assets over which managers have the most discretion. Cash can be misused by managers for their private benefits such as empire building, excessive compensation and perquisites consumption (Jensen and Meckling, 1976). Such actions can be detrimental for firm value, since shareholders anticipate private benefits extraction and incorporate

the risks into the firm's price. Dittmar and Mahrt-Smith (2007) demonstrate that the value of cash holdings differs with the level of corporate governance. Pinkowitz *et al* (2006) find that the relationship between firm value and cash is weaker in countries with poor investor protection. These results suggest that the value of cash holdings depends on the severity of the potential agency conflicts. This area calls for more research and deeper understanding because cash holdings have a direct impact on firm value.

Prior literature suggests that controlling institutional shareholders can efficiently monitor managers. For example, McConnell and Servaes (1990) report a positive relationship between institutional ownership and Tobin's Q. Chen *et al* (2013) report that shareholders of firms, which experience an exogenous analyst coverage decline, value cash less in anticipation of future agency problems (i.e. misuse of cash reserves). In contrast, Parrino *et al* (2003) find that institutional shareholders take a passive monitoring approach by selling their equity holdings in firms with poor corporate performance rather than exerting influence on managers. These mixed results imply that the extent to which block shareholders monitor companies is controversial. However, monitors are not homogeneous in their behaviour and willingness to monitor. For example, Ersoy-Bozcu and Lasfer (2005) show that the trading patterns and impact on share prices after block acquisitions are significantly different across major institutions, while others (e.g., Edmans *et al*, 2013) report that hedge funds monitor firms in which they hold large stakes.

I contribute to this literature by focusing on PE and VC investors, who represent a special type of institutional shareholders with specialized knowledge and value-adding expertise. There are several important differences between PE/VC investors and other institutional investors. In contrast to other shareholders, PE and VC investors hold seats on the board of directors along with block equity holdings (Cao, 2011; Krishnan *et al*,

2011). This, in turn, allows financial sponsors to be more actively involved in shaping firms' policies. In addition, PE and VC houses operate in the environment of repeat investing, where every few years they seek the same type of investors (limited partners) to commit capital to them. Gilligan and Wright (2012 p.18) report that "Substantially the largest investors in private equity in the UK have been pension funds which have accounted for around 35% of all monies invested in private equity funds." A favourable track record is important for PE and VC houses because potential LPs gauge the success by their past deals. Lastly, financial sponsors operate under the requirement to make distributions to limited partners before the end of the fund's fixed 10-year life (Phalippou, 2009). At the same time, PE and VC firms are likely to differ in terms of their investment strategies, as the former tend to back large, mature and old firms, while VC funds focus on small, high growth and young ventures. Past studies show that financial sponsors can effectively monitor their portfolio firms *before* the quotation.

In the third paper of the dissertation, I argue that PE and VC investors are effective monitors of backed IPOs' cash holdings in the *post-flotation* period. This is primarily driven by the fact that PE and VC investors aim to get a higher return from their extended investment. This study empirically investigates the relationship between post-IPO financial sponsors' voluntary ownership and firm's cash reserves. I expect the relationship to be of opposite signs for PE and VC voluntary ownerships, which is driven by fundamentally different types of firms these investors invest in. More specifically, I hypothesize to find a significantly negative (positive) relationship between post-IPO PE (VC) voluntary ownership and the firm's cash ratio. PE-backed firms are mature, large, publicly quoted companies in non-high-tech industries, with high free cash flows and low growth opportunities (Fraser-Sampson, 2010). Hence, PE-backed firms are especially prone to agency conflicts and managers are highly likely to misuse cash in these types of

firms. This leads me to expect PE investors with post-IPO equity ownership to minimize corporate cash reserves, whose misuse by managers would deteriorate PE sponsors' final return.

In contrast, VC investors' main objective is to identify private, young, high-tech ventures with a prospective idea. These firms are typically at the development stage and exhibit high growth opportunities (Fraser-Sampson, 2010). Hence, VC investors with post-IPO equity ownership would ensure the corporate cash reserves are high enough to finance the venture's future growth. In my analysis of cash reserves, I also control for the effect of fund characteristics (PE/VC fund bank-affiliation and syndicate size), as well as other micro- and macro-economic factors. Also, I expect VC IPOs to hold a higher proportion of assets in cash than in PE-backed firms, as a result of higher growth opportunities in VC firms and high agency conflicts in PE companies.

In addition, I assess the extent to which cash holdings is used inefficiently, i.e., destroys value, by computing the IPO aftermarket performance. I, therefore, contribute to the vast literature on IPO long-term performance (Ritter, 2013; Levis, 2011) by assessing the joint effect of cash holdings and financial sponsorship. In line with previous studies (e.g. Krishnan *et al*, 2009; Cao, 2011), I expect PE and VC investors to remain active monitoring agents and create value in their portfolio firms post-flotation. I hypothesize that financial sponsors are directly interested in monitoring and mitigating agency problems associated with cash reserves even post-flotation because of a high proportion of unrealized returns at the IPO date and concern for reputation. Hence, this leads me to expect cash reserves to be valued more by the market when financially sponsored IPOs hold more cash if PE and VC investors reduce agency conflicts by monitoring cash reserves.

B) Empirical Results

To test my hypotheses, I collect data on a sample of 446 PE- and 900 VC-backed IPOs floated on the US stock markets between 1997 and 2010. The main results can be summarized as follows. I find that, on average, VC IPOs maintain a significantly higher cash ratio[7] in contrast to PE-backed IPOs independently of the industry effect. I also show that several existing theories (transaction, precautionary, monitoring and agency) partly explain cash reserves of backed IPOs. I find, in line with my expectations, that PE voluntary ownership retention has a significant negative impact on the firm's cash holdings, while the relationship is positive for VC firms. I report that financial constraints have a negative impact on cash reserves of VC-backed companies, however, continued VC investors' ownership allows financially constrained firms to hoard cash. In addition, I find that PE and VC funds' characteristics (bank affiliation and syndicate size) have a significant impact on backed IPOs' cash reserves. In particular, IPOs backed by bank-affiliated funds have lower cash reserves, while more risky firms (i.e. those backed by lager syndicates) hoard more cash for the precautionary motive.

I also show that the market values cash more in companies in which PE investors voluntarily retain some equity in the post-flotation period. However, I do not find such relationship in VC-backed companies. This finding implies that, as expected, PE-backed companies are more prone to agency conflicts as a result of IPO firm characteristics, and by retaining shares post-flotation PE sponsors are able to monitor cash, mitigate agency conflicts and positively affect the aftermarket performance. Using an alternative methodology proposed by Faulkender and Wang (2006) as a robustness test, I find that the marginal value of an extra dollar of cash decreases with the level of cash and leverage in *retained* financially-sponsored IPOs only.

[7] Cash ratio as defined as the proportion of assets which is held in cash.

The results suggest that financial sponsors are able to effectively monitor corporate cash reserves, and ensure it is not misused by managers for their private benefits at the expense of shareholders. Therefore, involvement of activists with the sole purpose of increasing payouts to shareholders in firms with higher than average cash reserves will not be as effective for financially sponsored IPOs. In these firms, PE and VC investors are incentivized to monitor cash because they only lock-in a small part of their returns at the IPO date, whereas their final return is highly dependent on the firm's share price. In addition, limited partners should recognize that certain characteristics of PE and VC funding (i.e. fund's bank affiliation and syndicate size) have a significant effect on portfolio firms' corporate policies such as cash reserves, which might not necessarily be in line with their investment principles. In conclusion, this paper contributes to the extant literature on the increasing US corporate cash reserves by documenting that financial sponsors contribute greatly to this phenomenon. Moreover, the market, outside investors and shareholders should not be too concerned with financially sponsored IPOs (with continued PE and VC ownership) holding more cash. Overall, these results suggest that continued involvement of financial sponsors post-flotation is beneficial for shareholders.

Limitations

As all research, this dissertation has several limitations which should be acknowledged. First, I concentre on one type of exit route available for financial sponsors, and, as a result, some of my findings potentially cannot be generalized for backed firms which have been divested by acquisitions and secondary sales. However, it's of crucial importance to examine financially sponsored IPOs because a broader set of investors can invest in these firms and they should be aware of the continued financial sponsors' influence on corporate policies and implications for firm value. Second, I

consider recently quoted firms, and my findings are representative of companies that had recently undergone an IPO. As a result, some findings might not apply to very mature, public firms. Third, the sample suffers from the survivorship bias, as it only contains successful companies in which PE and VC have invested and brought to the stock market, rather than failed investments in firms that were not able to make it to the IPO stage.

The other limitation is that I consider one type of pre-IPO shareholders (i.e. PE and VC investors) and analyse their post-IPO behaviour and monitoring styles. Their divestment dynamics and continued support of portfolio companies is not representative of other pre-IPO block holders. Lastly, my analysis concentrates on two 'Anglo-Saxon' markets of quotation. A further examination of whether documented PE and VC firms' retention dynamics and value creation in the post-flotation period are wide-spread in other Western European counties, which are characterized by different institutional frameworks, more concentrated ownership and various level of activism for corporate control, could prove to be fruitful. Moreover, a more comprehensive ownership dataset (in terms of frequency) would allow me to examine the extent to which my results are altered or strengthened.

The rest of the dissertation is structured as follows. Chapter 2 presents the first empirical study entitled "Why do PE and VC Firms Retain Ownership after the Initial Public Offering?" Chapter 3 includes the second study of the dissertation entitled "Are Corporate Policies Affected by the Continued Presence of PE and VC Investors Post-IPO?" Chapter 4 contains the third study "Do PE and VC Firms Monitor Cash Reserves post-IPO?" Chapter 5 concludes the dissertation.

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Chapter 2: Why do PE and VC Firms Retain Ownership after the Initial Public Offering?[8]

Abstract

The paper assesses the determinants of voluntary PE and VC investors' ownership in the post-IPO period. I show that these investors retain shares to mitigate potential managerial expropriation of outside shareholders, but their retention propensity depends significantly on the fundamental characteristics of IPO, PE and VC firms, investment, and divestment intensity of different pre-IPO shareholders. I find that the financial sponsors' compulsory holding is significantly larger in US than in UK IPOs. The analysis of the aftermarket performance, based on the calendar-time approach, reveals strong negative average monthly abnormal returns for portfolios of backed IPOs over various holding periods, but the relationship between PE/VC voluntary ownership and the long-run performance is convex, suggesting that only large holdings create value.

Keywords: Private Equity; Venture Capital; IPO; Ownership Structure; Lockup; Aftermarket Performance.

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2.1 Introduction

Venture capital (VC) and private equity (PE) firms are known to invest in companies in order to conduct an intensive restructuring, provide certification, monitoring and value-adding activities. Jensen (1986, 1989) argues that management expertise, close monitoring and high leverage represent the core value drivers in private equity investments. When portfolio companies are under private ownership, PE and VC investors link compensation to performance, decentralize decision making, as well as alter the composition and functionality of the board of directors (Baker and Wruck, 1989; Baker and Gompers, 2003; Hochberg, 2003; Acharya *et al*, 2009). They then tend to bring them to the stock market in the form of initial public offerings (IPOs) to realize their returns, as this method is the most preferred (Giot and Schwienbacher, 2007), and profitable exit route (Brau *et al*, 2003).[9] It also constitutes an opportunity to build a track record and establish reputation for financial sponsors, which facilitates future fund raising (Gompers, 1996).

Despite the certification role of VC investors (Megginson and Weiss, 1991), financially sponsored IPOs' underpricing is not always lower than those of non-sponsored peers and the long-run returns are not always positive. Ritter (2014) reports that VC-backed IPOs demonstrated the highest average first-day return of 29.4% in comparison to non-financial sponsored (13.5%) and PE-backed IPOs (8.9%) during the 1980-2012 period. In the UK, Levis (2011) reports lower first-day returns of VC and PE IPOs in comparison to non-sponsored companies. Both types of financially sponsored IPOs on average outperform their non-sponsored peers. The average 3-year buy-and-hold return of the buyout sample of 34.1% is followed by VC IPOs' performance of 19.8% and non-sponsored IPOs' of 17.5% (Ritter, 2014). However, the performance of VC-

[9] According to the "European Private Equity and Venture Capital Association 2010 Yearbook," an IPO is the second most frequently used exit route in 2008-2009.

backed IPOs differs across periods and VC-backed IPOs underperformed non-financial peers during the 1999-2000 and 2001-2012 periods (Ritter, 2014).

Previous studies focus mainly on the impact of these sponsors on the first day returns assuming that they sell all their holdings at the IPO date. The analysis of their holdings in the post-IPO period is relatively limited, even though in practice these institutional investors do not exit fully at the IPO date (Lin and Smith, 1998; Megginson and Weiss, 1991). Cao (2011) reports that one year after the flotation buyout sponsors hold, on average, an equity ownership of 32.36%, while Barry *et al* (1990) find that venture capital investors retain 24.6% of outstanding shares immediately after the flotation. More recently, Celikyurt *et al* (2014) report that VC firms serve on the board of many companies, including those they do not back, after their IPO. They show that such appointments lead to significant value creation. On average, PE investors stay involved in portfolio companies for 2.8 years after the initial public offering (Furth and Rauch, 2014).

The purpose of this paper is to contribute to this literature by assessing the determinants of PE and VC investors' ownership retention in the post-flotation period and the impact of such holding on the firm's aftermarket performance. I expect VC and PE investors to retain equity holdings in the post-IPO period in firms which are likely to generate higher long-run returns, for at least two reasons. First, given that these funds are professional investors who require a high rate of return, their holdings could be viewed within their overall investment strategy. Therefore, they are likely to carry on holding stakes in IPOs with good growth opportunities. Second, since they had experience in investing in the pre-IPO period, they are likely to know better the firm and to be effective monitors. To assess these effects, I test two main hypotheses: signalling and commitment. The signalling hypothesis states that in financial markets with

imperfections (e.g. information asymmetries), financial sponsors use post-IPO voluntary ownership as a signal of the firm's future great prospects, thereby conveying to the market the firm's true value (Leland and Pyle, 1977). The commitment hypothesis suggests that PE and VC investors' post-IPO shares are used to mitigate outside shareholders' concern of managerial expropriation of private benefits.

To test these hypotheses, I use a sample of 1673 IPOs, split into 136 PE-backed and 191 VC-backed IPOs in the UK, and 446 PE- and 900 VC-backed firms floated on the US stock markets. I classify these IPOs into three main categories depending on PE/VC post-IPO holdings: (i) IPOs with voluntary holding, which represents any ownership which is not subject to lockup agreement, is above the specified lockup restrictions, or held after the post-lockup expiration date;[10] (ii) IPOs with compulsory holding, which denotes any ownership held through lockup agreements, and (iii) IPOs with no holdings if the sponsors have sold all their shares at the IPO date.

I find strong support for the commitment hypothesis. I document a significant negative relationship between PE/VC holdings and the proxy variables used to measure agency conflicts, including lagged institutional ownership and M/B ratio. In the VC-backed IPOs, I find significant positive relationship between VC syndicate's post-IPO ownership and syndicate size as well as low proximity dummy. In addition, I present evidence that PE investors reduce their voluntary ownership in companies which perform well operationally.

I report that financial sponsors' post-IPO ownership is negatively related to the aftermarket stock performance. Overall, the results suggest that the terms[11] of PE/VC lockup provision are used to alleviate moral hazard concerns. I run some robustness tests (instrumental variable approach) and find similar results. I document a convex

[10] Lockup expiration date is also referred to as the unlock day.
[11] The percentage of company's shares locked which are held by PE and VC investors.

relationship between long-run performance and financial sponsors' holdings in the post-IPO period. The results of the four factor model suggest that backed IPOs underperform in the long-run, irrespective of whether financial sponsors choose to retain ownership in the post-IPO period. I find that momentum does not explain excess returns of backed IPOs.

Overall, my results are not consistent with previous evidence as they suggest that PE and VC firms do not necessarily lead all portfolio companies to create value in the post-IPO period. Celikyurt *et al* (2014) argue that VC firms create value by sitting on the board of mature firms and bringing particular expertise to help firms undertake more efficiently their investment policies, particularly those that are knowledge-specific and related to intangible assets. They show that firms where VC directors sit on the board are more innovative as measured by R&D expenditure, number of patents and their citation counts. Such firms are also more likely to acquire a VC backed firm, establish strategic alliances with other VC backed firms, and undertake a corporate venture capital (CVC) investment in VC backed entrepreneurial start-ups. These investments and alliances are considered to be important sources of innovation (Chesbrough, 2002; Dushnitsky and Lenox, 2005, 2006; Chemmanur *et al*, 2012; Robinson, 2008). I consider that such VC impact may be observable in the pre-IPO period when the sponsors sit on the board, rather than by just carrying on holding stakes in the post-IPO period. Moreover, the findings of Celikyurt *et al* (2014) are more likely to apply to firms in which VC investors were not pre-IPO shareholders, which is my focus. In addition, since my sample is not limited to only VC-backed firms, any increase in efficiency observed in VC boards is not likely to apply to PE-backed IPOs.

The analysis of my sample firms shows strong differences across the US and UK. Throughout the sample period, around 50% of UK backed IPOs are VC sponsored. In

contrast, in the US, the importance of VC funding in comparison to PE financing changes substantially during my sample period. For example, in 1999 85% of backed IPOs were VC sponsored, while in 2002 only 35%. Hence, in contrast to UK, where both type of financing play an equally important role in bringing companies to the stock market, the relative importance of VC-backed IPOs in the US is time dependent. I, therefore, run separate multivariate analyses of UK and US samples. I report that financial sponsors' voluntary holdings are driven by different set of variables, which are related to differences in institutional settings. However, my main results still hold.

I also report strong industry differences in my sample firms. In particular, the VC-backed IPOs in the UK are equally distributed across difference industries: on average, 50% of IPOs in any of the ten industries are VC-backed.[12] In contrast, there are several clearly evident industries in which VC financing is more (less) prominent in the US such as high-tech, telecommunications and healthcare (non-durables and energy). Hence, the significant differences in the relative importance of VC sponsored IPOs and VC financing concentration in some industries in the two markets of flotation provide strong incentives to examine financially sponsored IPOs in the US and UK, as well as to analyse the divestment trends of financial sponsors in these firms.

As expected, and consistent with previous studies (e.g., Levis, 2011), I find that PE and VC sponsored firms differ significantly with respect to IPO firm characteristics, which is explained by the nature of the firms the two types of financial sponsors invest in. However, I also show significant differences across the two markets. More specifically, in contrast to UK peers, PE-backed IPOs in the US are significantly larger, more profitable, and backed by larger, bank-affiliated and older PE funds with close proximity to IPO firm headquarters. They are also more likely to be high-tech affiliated

[12] Except for firms in the healthcare industry: 76% of them are VC sponsored.

and underwritten by global underwriters. The terms of the lock-up agreements applicable to financial investors in the US and UK differ significantly: financial sponsors' and managerial lockup agreements are significantly longer in the UK. In addition, I show that backed IPOs in the US and UK differ significantly across a number of other characteristics such as financial sponsors' syndicate and ownership structure. For example, financial sponsors' ownership is significantly higher in the pre- and post-IPO period in the US than in the UK.

Relative to the UK, the US VC-backed IPOs are significantly larger (in terms of total assets), more profitable, high-tech affiliated, and less likely to be underwritten by global underwriters or to be listed on the main NYSE market. They also exhibit lower leverage, shorter lockup period and they are backed by larger VC syndicates. I find that divestment dynamics of different groups of pre-public shareholders around the flotation date also differ in the UK and US quoted VC firms: US quoted VC firms exhibit statistically higher (lower) sponsors and management equity ownership (institutional investors) than in VC firms floated on the UK stock markets. I also find that financial sponsors involved in US quotations hold a higher proportion of the firm's outstanding shares in their lockup agreements. I also show that voluntary holdings in IPOs where financial sponsors have been subject to selling restrictions are significantly higher than when the syndicate is free to sell/distribute shares immediately after the IPO. I account for these factors by reporting separate results for PE and VC-backed IPOs in UK and US markets and by including industry dummies.

The rest of the paper is structured as follows. Section 2 presents the theoretical background and development of testable hypotheses. Section 3 describes the data and methodology. The empirical results are presented in section 4, and the conclusions are reported in Section 5.

2.2 Literature Review and Testable Hypotheses

Previous studies report that VC firms do not sell their whole equity stake at the IPO (Barry *et al*, 1990). In particular, lead (Lin and Smith, 1998) and more reputable (Krishnan *et al*, 2011) VC investors tend to hold significantly higher shareholdings and directorships. Similarly, Cao (2011) finds significant ownership retention by PE sponsors in US IPOs. However, such ownership can be compulsory when it is under the lockup agreement, or voluntary if the holding is not subject to lockup constraints. In the following section, I will distinguish between these two holding mechanisms, PE and VC holdings, and US vs. UK institutional settings, and derive the relevant hypotheses.

2.2.1 Compulsory Ownership through Lockup Agreements

Previous studies focus mainly on the post-IPO holdings through lockup agreements with the underwriter, which specify the number of shares locked and the lockup duration. Their provisions are solely governed by the agreement, and not a legal obligation. The lead underwriter is the only party which has the right and the ability to release locked investors early.[13] Brav and Gompers (2003) propose three explanations for the existence of lockup agreements: a signal of firm quality, a commitment device, and a mechanism to extract additional compensation from the issuing firm. Several past studies examine the signaling aspect of lockups. Leland and Pyle (1977) consider ownership retention by insiders, and argue that when an insider sells a significant percentage of shares at the IPO it signals the firm's overvaluation. In contrast, insiders who retain shares for longer and endure the cost of remaining undiversified signal superior quality of the company. Courteau (1995) examines another aspect of lockup agreement, i.e. its length, and argues that firms signal their superior quality by means of longer lockup

[13] In some circumstances, the lead underwriter allows locked investors to sell some or all of their shares prior to the lockup expiration; this is referred to as an 'early sell' transactions. See Hoque and Lasfer (2013) for details.

duration. In their empirical study, Brav and Gompers (2003) propose that lockups can be used to signal firm's quality which cannot be observed by investors. While their results do not support this hypothesis, they were contradicted by Brau *et al* (2005) who find that lockups do signal firm's quality. Brau and Fawcett (2006) report that the vast majority of Chief Financial Officers (CFOs) consider that insiders' divestment at the IPO date as a negative signal, compared to the positive signal conveyed by insiders' lockups and VC-backing.

The commitment hypothesis deals with managers' potential to take advantage of shareholders by means of shirking and perks consumption. The commitment hypothesis states that lockup provisions exist to alleviate outside investors' concerns regarding moral hazard issues. Consistent with these predictions, Brav and Gompers (2003) find that investment banks impose longer lockups for companies with higher moral hazard in the aftermarket. According to the commitment hypothesis, reputation and certification are viewed as alternative commitment devices. These arguments are based on previous literature which considers that block shareholders can provide monitoring, thereby mitigate any potential agency conflict between managers and shareholders. Cronqvist and Fahlenbrach (2009) demonstrate that large blockholders and institutional investors are active monitors, who have significant impact on US firms' corporate policies and performance. Chen *et al* (2000) report that institutional shareholders' ownership is positively related to performance of US firms, thereby demonstrating the monitoring effectiveness of institutional shareholders. The potential monitoring can also be provided by other market participants such as equity analysts. For example, Chen *et al* (2012, p1) demonstrate "that as a firm experiences an exogenous decrease in analyst coverage, shareholders value internal cash holdings less, its CEO receives higher excess

compensation, its management is more likely to make value-destroying acquisitions, and managers are more likely to engage in earnings management activities."

2.2.2 Compulsory and Voluntary Ownership by PE versus VC funds

The question, however, remains as to whether such hypotheses apply also to voluntary holdings which arise when pre-IPO investors, particularly VC and PE funds, retain their holdings without lockup constraints. Given that lockup ups are driven by the agreements with the underwriters, they would not necessarily emanate from the willingness of the PE and VC funds. In this section, I argue that their impact to be stronger in the case of voluntary ownership.

Lockups can apply to all pre-IPO investors. However, the terms may differ for directors, PE/VC sponsors and other initial (institutional) shareholders. PE and VC investors represent a special class of block holders, who have industry-specific knowledge and specialize in restructuring and value-adding activities. These financial sponsors are known to initiate intense restructuring of portfolio firms (Cornelli *et al*, 2010; Baker and Gompers, 2003; Lerner, 1995) and to be effective monitoring agents (Krishnan *et al*, 2009; Celikyurt *et al*, 2014). In this paper, I argue that financial sponsors' continued (compulsory and voluntary) ownership in the post-IPO period reduces information asymmetries, mitigates any potential agency conflict between managers and shareholders, as well as uncertainty regarding insiders' actions.

For PE and VC firms, a lockup provision is a major undertaking. These investors operate under the approach of a fund's termination date, and a longer holding period has a negative effect on the IRR.[14] A track record of high IRRs is extremely important for PE and VC firms because prospective limited partners (LPs) use it as a criterion to assess PE

[14] Robbie, Wright, and Chiplin (1997) report that independent VC funds' performance is more likely to be assessed on the basis of the internal rate of return.

managers' performance (Fleming, 2010), and take it into consideration in their decision to commit capital to a particular PE/VC house. Sorensen *et al* (2014) examine whether PE investments' performance is sufficient to compensate investors for the costs they face such as long-term illiquidity, risk and fees. They find that LPs break even, net of costs. This finding provides an even greater incentive for LPs to choose carefully the PE/VC houses to which they commit capital. Therefore, PE and VC sponsors (as any other type of investor) benefit from managers' focus on value maximization, which ensures a favorable track record for financial sponsors.

High proportion of unrealized returns at the IPO date incentivizes and motivates PE and VC investors to closely examine management's actions, performance, and if necessary, to exert institutional activism. The recent move towards binding votes on executive pay in the UK demonstrates that shareholders are becoming more active and could have a major impact on various aspects of the company's operations and management.[15]

Hence, financial sponsors with continued ownership in the post-flotation period are expected to carry on monitoring their portfolio firms to reduce information asymmetries, mitigate any potential agency conflict between managers and shareholders, as well as uncertainty regarding insiders' actions. However, such role is likely to be more pronounced in the voluntary holdings which encompass the following three scenarios: holdings without any lockup requirement, those above what is required in the lockup agreement, or holdings after the post-lockup expiration period. The third case is particularly interesting: ownership adjustments made after the unlock day could shed light on whether PE and VC investors consider lockup agreements to be a major

[15] Anonymous, 2012. Vince Cable forces binding executive pay votes, BBC, [online] Available at: <http://www.bbc.co.uk/news/business-18514396> [Accessed: 10th July, 2012].

constraint and thus use it as an opportunity to conduct a full exit, or whether they retain their holdings regardless of associated costs.

Field and Hanka (2001) find a substantial long-term increase (of 40%) in trading volume at the lockup expiration, and VC investors' selling intensity is higher than the ones demonstrated by other pre-IPO shareholders. Gompers and Lerner (1998) examine share distributions made to LPs post-flotation,[16] and find that, on average, VC firms make the majority of share distributions twenty months after the IPO date. In contrast, Furth and Rauch (2014) report that in only 9% of their sample with lockup provisions PE sponsors sell shares at the lockup expiration date or within four weeks thereafter. Moreover, US buyout sponsors reduce their representativeness on portfolio firms' boards of directors only two years post flotation. Overall, previous studies suggest that PE and VC firms' divestment strategies (after the unlock day) differ with respect to the timing and selling intensity, however their continued post-IPO presence is undeniable.

The commitment hypothesis also yields predictions regarding alternative forms of certification. Brav and Gompers (2003) consider the mere existence of a VC investor pre-flotation to be an alternative form of certification. In this paper, I propose that PE/VC house's reputation should be considered and that there is less need for continued financial sponsors' ownership in the post-IPO period. Previous studies report that favorable PE and VC firm's reputation enhances access to stream of deal flows (Hsu, 2004), facilitates the ease of syndication (Hochberg *et al*, 2007), and allows financial investors to act as a lead syndicate member. In addition, PE and VC houses operate in an environment of repeat investing, where every few years they seek the same type of investors for capital.

[16] VCs can exit their investments post-flotation by either selling shares in the open market or distributing them to limited partners, who in turn will decide when and how many shares to sell (Gompers and Lerner, 1998). The latter method is used more frequently by VC firms in the US for four primarily reasons: there are no restrictions on how much could be distributed, tax liability could be postponed, avoidance of possible downwards price pressure associated with the sale of shares, and a positive impact on distributions of VC houses' compensation.

As a result, more reputable PE and VC firms would not risk their reputation by being involved in companies where insiders are likely to take advantage of shareholders. Similarly, a global investment bank would aim to avoid any reputational damage. The commitment hypothesis is likely to suggest that PE and VC investors' ownership is lower in IPOs backed by reputable PE/VC investors and underwritten by reputable investment banks. Overall, these commitment arguments lead to the following hypothesis:

Hypothesis 1: The voluntary ownership of PE and VC investors is used to mitigate any potential agency conflicts between managers and shareholders.

PE and VC holdings can also be used to signal firm quality. By listing the company, PE and VC investors gain the ability and flexibility to sell shares any time[17] post-flotation, to carefully assess, as well as time their full exit more favorably in terms of prevailing market conditions and share price.

Courteau (1995) argues that firms could signal their superior quality by means of longer lockup agreements. However, PE and VC firms may choose not to signal firm's quality by means of longer lockups in order to retain their flexibility in divestments' timing and be able to use windows of opportunity (if such exist) soon after the flotation. Alternatively, PE and VC firms could signal the IPO's quality by voluntarily retaining shares after the flotation. Leland and Pyle (1977) argue that the fraction of holdings retained by company's insiders serves as a signal of the IPO's quality. Ritter (1984) reports a positive relationship between insiders' holdings at the time of flotation and firm value. Hence, by retaining shares in the post-flotation period PE and VC firms could signal to the market the portfolio firm's high quality.

[17] Any time after the lockup expiration date.

By postponing their full exit, PE and VC investors are bearing the following costs: negative impact on the IRR, tied up capital, market and general firm risk. Additionally, PE and VC firm's managers are constrained in their ability to support new ventures, since many of them remain on firms' boards of directors (Furth and Rauch, 2014). Hence, PE and VC investors would only be willing to retain shares in IPOs which will perform well post-flotation, and in those where expected future returns would overweight expected costs.

The lockup expiration date is characterized by a high degree of information asymmetries. Brau *et al* (2004) argue that information asymmetries between firm's insiders and outsiders are not fully mitigated by the use of a lockup agreement because not a vast majority of mandated information is revealed between the initial public offering and the lockup expiration date. Information asymmetries between company's insiders and outsiders are particularly high at the lockup expiration date, which is driven by insiders' (including PE/VC firms) ability to fully divest without the need to inform other investors regarding the magnitude of planned ownership adjustment. As Brau *et al* (2004, p.77) argue "Insiders planning or considering the sale of personal shares at lockup expiration have incentives to withhold information strategically, and it is reasonable to assume that general investors are aware of this moral hazard potential." Therefore, I argue that PE and VC investors *voluntary* retain shares post the unlock day in order to mitigate outside shareholders' concern of managerial expropriation of private benefits. Hence, I expect PE and VC funds to hold high stakes (both, compulsory and voluntary) in firms with higher agency conflict, information asymmetry, moral hazard and greater need of monitoring.

Overall, these arguments yield the following signaling hypothesis:

Hypothesis 2: The ownership of PE and VC investors in the post-IPO period signals firm's quality, leading to potentially higher expected returns.

2.2.3 US versus UK Stock Markets

The US and UK markets have the 'Anglo-Saxon' model of corporate governance, which primarily focuses on shareholders' interests. Pinkowitz *et al* (2006) report that these markets are similar along the following country-level characteristics: the protection of shareholder rights, the overall political risk climate, the level of government corruption, the law-and-order tradition, government centralization and the risk of outright confiscation.

However, there are several important differences between the two countries. For example, the lockup terms are not homogeneous, as the average lockup period in US IPOs is 180 days (Brav and Gompers, 2003), while in the UK it ranges from 6 to 36 months[18] (Hoque and Lasfer, 2013). The specification of lockup expiration is also different across the two markets, as in the UK, it is common to relate the expiry date of a lockup agreement to some corporate event such as the publication of a preliminary or annual report, as opposed to providing a specific calendar date in the US (Hoque and Lasfer, 2013). Hence, examination of PE and VC investors' ownership post-flotation requires a careful consideration of lockup provisions, which significantly affect PE/VC investors' post-IPO ownership holdings across US and UK markets.

The two countries differ also in terms of governance. In particular, UK companies split the roles of the CEO and Chairman, which has been triggered by the original Cadbury Code recommendations of 1992, while there is no such legal requirement in the US. Consequently, in 2010, 94% of UK FTSE 100 companies split the CEO-Chairman role, in contrast to 40% of S&P 500 firms in the US (Davis, 2011). The separation of the

[18] The average lockup duration in the UK is 365 days (Hoque and Lasfer, 2009). Espenlaub *et al* (2003) concentrate exclusively on VC-backed IPOs floated on UK markets, and report the average lockup length of 561 days.

two roles not only avoids the CEO entrancement, but it also boosts monitoring ability and independence of the board. Hence, as a result of this, it could be argued that, overall, there is a higher possibility of agency conflicts in the US companies than in the UK ones.

Secondly, on average, there is a higher level of information asymmetry in the UK market in comparison to the US. In the latter market, companies are obliged by the SEC rule (Regulation Fair Disclosure) to disclose important news and information to all market participants at the same time. While in the UK there is no such rule and stock market observers identify an unequal information access by private and institutional investors (Stokopedia, 2011).

The above evidences result in different levels of information asymmetries and potential of agency conflicts in the UK and US, which could be summarized in the table below. This matrix demonstrates that in comparison to the UK market, firms quoted on the US stock markets operate in an environment with higher agency conflicts and lower information asymmetries.

IPOs	**UK**[19]	**US**
PE	Moderate information asymmetry High agency costs	Low information asymmetry Very high agency costs
VC	High information asymmetry Low agency costs	Moderate information asymmetry Moderate agency costs

This matrix also reflects the fact that firm characteristics of PE- and VC-backed firms impact their relative information asymmetries and agency conflicts. For example, PE are known to be larger, more mature, with high leverage and low growth opportunities, whereas VC-backed firms are characterized by high growth stage, young age and low leverage. Larger firms tend to have more information available to investors/markets (Barry and Brown, 1984), and are followed by more analysts, which

[19] The following scale is used to define the level of information asymmetry and agency conflict: very high, high, moderate and low.

leads to less uncertainty regarding insiders' actions. Whereas investors are more concerned with potential misuse of resources in firms with lower growth opportunities. This, in turn, results in PE-backed IPOs' relative lower information asymmetry and higher agency conflict in comparison to VC IPOs in both countries.

There are two additional differences between the UK and US markets. The two countries are governed by different set of rules and regulations. Firms in the UK pay particular attention to the Listing Rules and the Combined Code on Corporate Governance, whereas companies located in the US rely on detailed regulations listed in the Sarbanes-Oxley Act of 2002. In addition, ownership concentration and identity of the largest shareholder differs significantly in the two markets. In contrast to other countries, US firms are much more likely to have dispersed ownership (La Porta *et al*, 1999). The threshold above which investors need to declare their block holding is 3% in the UK compared to 5% in the US. In addition, Faccio and Lasfer (1999) state that institutional (individual) investors are the largest category of shareholders in UK (US). Prowse (1994 p.33) highlights the importance of major shareholder type identity by arguing that "The identity of a firm's large shareholders may also have implications for governance. Individuals (or families), financial institutions and non-financial corporations may have different monitoring skills, a greater or lesser incentive to monitor and even different objectives." In sum, the lesser prevalence of block holders in the US calls for higher PE and VC investors' monitoring.

As the result of identified differences between UK and US, as well as PE and VC IPOs, I expect the commitment motive to have a greater impact on financial sponsors' ownership in PE-backed IPOs (especially those quoted in the US) than on VC IPOs. Overall, I expect the institutional differences between UK and US to affect financial sponsors' extent of exit at the IPO date, as well as the post-IPO ownership concentration.

Although this paper is partly related to the study by Brav and Gompers (2003), it differs in five major respects. Firstly, I exclusively concentrate on the lockup restrictions applicable to PE and VC investors, in contrast to Brav and Gompers (2003), who consider all insiders as one broad class.[20] Second, I provide an analysis of another aspect of lockup agreements (i.e. equity holdings locked), as opposed to lockup duration. Brav and Gompers' (2003) study is based on the 1988-1996 time period, whereas I use a more updated and recent sample of IPOs (1997-2010) in two countries. During my sample period, the industry has experienced two additional boom and busts (the dotcom bubble and 2007 financial crisis), which could have altered previously reported relationships. Additionally, I contribute by analyzing PE-backed IPOs, in contrast to the study by Brav and Gompers (2003), which only considers VC and non-backed IPOs. Finally, my sample includes IPOs floated on UK stock markets, which is considered to be the second most significant after the US.[21]

2.3 Data and Methodology

2.3.1 Data Sources and Sample

The sample used in this study includes all non-financial PE- and VC-backed IPOs floated in the US and UK markets between 1997 and 2010. This specific time frame is examined due to the following two reasons: Thomson One Banker's ownership data coverage starts in 1997 and I examine the three year post-flotation window. I use LSE for UK and SDC database for US to collect IPO names and dates of admission. I exclude financial IPOs because of their specific characteristics, particularly their capital structure.

[20] It is important to note that in many cases the terms of lockup agreement applicable to prepublic shareholders (i.e. managers, PE/VC firms, and other institutional investors) are different in IPOs floated on UK stock markets.

[21] In 2009, UK received 21% of all private equity investments in Europe, which is the highest percentage than in any other European country (EVCA, 2010). UK PE and VC-backed companies account for 23.8% of all European divestments in 2009.

I identify financially sponsored IPOs from several sources. For UK IPOs, I first use the British Venture Capital Association classification of PE- and VC-backed IPOs, which have been floated between January 1997 and September 2005. For the remaining period, I use individual IPO prospectuses and *Unquote*, an online trade publication which provides regular details on individual VC and buyout transactions. For the US sample, names of PE and VC-backed IPOs, which have been quoted between 1997 and 2007, are taken from the study by Liu and Ritter (2011). For the rest of the sample (2008-2010), SDC Platinum Database is used to gather the names of backed IPOs. The final sample consists of 327 UK and 1346 US financially sponsored IPOs.

I download IPO prospectuses from Perfect Filings database and collect by hand names of PE and VC firms, dates of PE and VC financing, offer price, market of quotation, underwriter names, management's, block holders', PE investors' and venture capitalists' equity holdings immediately prior to and post admission. I also collect details of the lockup agreement (duration and percentage of locked shares) applicable to directors, institutional and PE/VC investors. I use COMPUSTAT database to collect the pre- and post-IPO accounting data. The names of lead underwriters are gathered from SDC database for the US sample. For the UK, I collect this data from IPO prospectuses. It is common in the UK to relate lockup expiry date to some corporate event. Hence, Perfect Filings Database is used to extract relevant calendar dates. Daily stock prices and various[22] price indices are collected from DataStream.

For each company in the sample, post-IPO quarterly ownership data is gathered from Thomson One Banker. I gather the names of directors, initial shareholders and PE/VC firms from IPO prospectuses which I then match individually with the ownership data provided by Thomson One Banker. I use also quarterly ownership data to confirm

[22] FTSE All-Share, S&P 500, AIM All-Share and NASDAQ price indices are used in this study.

whether investors specified in the 'major shareholders' section of IPO prospectuses are individuals or institutional investors. Finally, I collect PE and VC house and fund reports from Thomson One Banker.

The total sample is divided into two groups depending on whether PE and VC syndicates conducted a full exit, or retained some ownership at first ownership quarter post lockup expiration date. Thomson One Banker provides ownership data in March, June, September and December. In this analysis, an examination of ownership adjustments made in first ownership quarter post the unlock day is considered, as opposed to an exact lockup expiration date. However, this should not have a material impact on the results presented, since this would only overstate PE/VC firms' tendency to exit at or soon after the unlock day. A more comprehensive ownership data (in terms of frequency) would allow to examine PE and VC firms' ownership adjustments made on the exact date of lockup expiration, and re-confirm the presented results.

Upon reviewing twelve quarters of post-IPO ownership data for each company in the sample, I identified cases where for a number of consecutive quarters PE/VC investors' ownership data contains blanks, which are always followed by some declared ownership stake.[23] PE and VC firms invest in companies to restructure, add value, and conduct an exit via an IPO (or any other divestment route) to realize returns and make distributions to limited partners (LPs). Their business model does not entail heavy trading of company's shares post-IPO, as opposed to other types of shareholders such as hedge funds. Thus, for PE and VC investors, who backed an IPO and held shares for a number of quarters post-flotation, missing data should not be interpreted as zero equity holdings because these data gaps are followed by some declared ownership stake. In order to deal with this matter and make reasonable assumptions regarding what happened in quarters

[23] Upon contacting the data provider, it was advised that ownership data is collected from primary four sources: investor's filings, regulatory agencies, publicly available websites, and third party providers. The position is dropped in case there was no filing from the investor.

of missing data, two complementing approaches are used. First, the ownership section of annual company reports is used to fill in the gaps. For the rest, missing data is filled with an ownership stake reported immediately after the quarter of missing data. Overall, I believe that these two complementing approaches are reasonable and consistent with the PE and VC business models.

2.3.2. Baseline Model Specification

To investigate the commitment hypothesis, I use the following Model (1) where the dependent variable is compulsory or voluntary PE/VC syndicate ownership in various quarters post-flotation:

$$\textit{Post-IPO ownership} = \beta_0 + \beta_1 \textit{US Dummy} + \beta_2 \textit{ Proportion of PE/VC Ownership sold at IPO} + \beta_3 \textit{Syndicate Size} + \beta_4 \textit{Low Proximity Dummy} + \beta_5 \textit{Bank Affiliated Dummy} + \beta_6 \textit{House Age} + \beta_7 \textit{Underwriter Reputation} + \beta_8 \textit{ Institutional Ownership}_{t-1} + \beta_9 \textit{Size}_{t-1} + \beta_{10} M/B_{t-1} + \beta_{11} ROA_{t-1} + \beta_{12} CARs_{t-1} + \textit{Industry Dummies} + \textit{Year Dummies} + \varepsilon \quad (1)$$

Post-IPO ownership is the proportion of shares held by PE or VC funds as a group. The independent variables include some proxy variables for the severity of the agency conflicts. The institutional differences between the US and UK imply the coefficient of US Dummy (β_1) to be positive and statistically significant to reflect the relatively higher agency costs in the US, particularly given the likely combination of the chairman and the CEO. In addition, Model 1 is run separately for UK and US financially sponsored IPOs to shed light on whether institutional differences in these two markets have an impact on the drivers of financial sponsors' equity ownership.

2.3.2.1 PE and VC Syndicate Size

I use a number of PE/VC fund and syndicate characteristics as proxy variables in this paper. It is common for PE and VC investing to take place in a syndicate. In this paper, I use syndicate size as a proxy variable for firms' moral hazard and riskiness. More specifically, larger syndicates are associated with more risky firms and those with higher moral hazard potential. A larger and more diverse syndicate is beneficial for its members because it allows investments in ventures which are located in other countries (Sorenson and Stuart, 2001). Also, syndicate members benefit from complementary knowledge sharing (Brandler *et al*, 2002), gain access to deal flows by means of reciprocity (Hochberg *et al*, 2007), as well as attain another fund's credible opinion regarding valuation and prospects of a venture (Lerner, 1994).

However, previous studies have reported that larger syndicates are subject to free-riding problem (Chemmanur and Tian, 2011), inefficient communication as well as a slow decision making process (Wright and Lockett, 2003). Moreover, within a syndicate there could be a great degree of heterogeneity in terms of funds' characteristics (e.g. fund age, affiliation and location), which ultimately imposes divergent liquidity needs, financial and strategic goals (Hellmann, 2002; Hellmann *et al*, 2004). As De Vries and Block (2010) remark "Agency problems among syndication partners may arise (Fried and Hisrich, 1995). These agency problems increase when the syndication partners have different investment objectives and time horizons." Wright and Lockett (2003, p. 2083) argue that "The origins of the agency (management) cost imposed by the syndicate may be created by the diverse objectives of members, which may become more apparent with larger numbers of partners."

In addition, portfolio firms backed by larger syndicates are also viewed as more risky investments. For example, VC financing takes place at early stages in technology

companies, which are characterized by high probability of failing. Therefore, in order to reduce VC investors' exposure and risk, venture capitalists provide funding in several rounds and co-invest with other VC firms.

Hence, IPOs backed by larger PE/VC syndicates have higher potential for moral hazard due to the syndicate's diminished degree and effectiveness of monitoring, as well as considered to be more risky companies. In contrast, firms backed by smaller syndicates are associated with less moral hazard potential because smaller syndicates are more efficient and exhibit faster decision making (Wright and Lockett, 2003). Better coordination of actions within the syndicate limits managers' ability to engage in actions which solely benefit them at the expense of other shareholders. Therefore, according to the commitment hypothesis, I would expect to find the syndicate size dummy coefficient (β_3) positive and statistically significant.

2.3.2.2 PE and VC Fund Location

Cross border investing is common in PE and VC financing. According to Chemmanur and Fulghieri (2014 p2) "Foreign or cross-border investment in venture capital markets has increased from 10% of all venture capital investments in 1991 to 22.7% in 2008." Hence, the proximity of PE/VC fund and its portfolio companies needs to be considered. Location proximity results in a reduction of travel time (Krishnan *et al*, 2009), greater venture capitalists' representation on the board of directors (Lerner, 1995), and facilitation of monitoring activities (Sorenson and Stuart, 2001). In contrast, Wong (2010) finds geographic proximity to have a negative impact on the probability of venture capitalists' representation on the board. Wong (2010) argues that close geographic proximity results in reduced need for contractual monitoring such as board representation.

At the IPO date, PE and VC investors make considerable adjustments to their holdings. According to Levis (2011), private equity syndicates decrease their pre-IPO ownership from 55.9% to 26.1%, while VC syndicates make a less drastic reduction from 33.9% to 23.1%. Thus, immediately post-flotation, PE/VC funds' abilities to continue monitoring and exerting pressure on the firm's operations are considerably reduced due to PE/VC lower equity holdings, emergence of other block holders and the company's public status. This effect is especially pronounced for PE/VC funds located in another country than its venture because the funds' monitoring abilities are constrained by distance. Lerner (1995) finds that the geographic proximity of a VC fund and portfolio company has a significant positive effect on the VC representation on the board of directors, which the author explains by lower costs associated with monitoring local firms. PE/VC investors' close proximity to the venture improves due diligence (Cumming and Johan, 2009) and enhances monitoring activities.

In this paper, I use the low proximity of IPO firm and PE/VC lead investors' headquarters as a proxy variable for monitoring. Thus, when PE/VC investor is geographically close to their venture, managers of these IPOs have less opportunity to shirk, consume perks, and reject risky yet profitable projects. According to the commitment hypothesis, I expect to find the lox proximity dummy coefficient (β_4) positive and statistically significant.

2.3.2.3 Bank Affiliation of PE and VC Fund

PE and VC funds operate under various organizational structures (such as captive[24] and independent), which have different financial and strategic goals (Hellmann, 2002; Hellmann *et al*, 2004). Botazzi *et al* (2008) report that financial sponsors'

[24] "Captive" funds are those which are either corporate, bank or government-owned.

organizational structure and general partners' (GPs) business experience are major determinants of an active investment style imposed by PE investors, which in turn, positively affects the success of portfolio companies.

Caselli *et al* (2010) consider five types[25] of ownership structures, which are characterized by different levels of conducted monitoring, and conclude that it has a significant influence on the performance of ventures. They report that bank-owned funds conduct less monitoring of portfolio firms due to general partners' representation on a high number of portfolio firms' boards simultaneously: on average, bank-owned PE representatives sit on 8.19 boards. In contrast, independent fund managers sit on 6.11 boards. Consequently, the amount of monitoring and supervision conducted by bank-affiliated fund is considerably lower, which in turn, leads to portfolio company's lower revenue growth and IRRs.

Moreover, bank-owned funds have different strategic goals, which impact their investment and exiting activities. Hellmann *et al* (2004) argue that bank-affiliated funds invest in ventures with the aim of establishing new relationships for future lending. Tykvova (2007) demonstrates that bank-affiliated funds have different investment patterns in comparison to funds with other structures. More specifically, they invest in companies just before the flotation, take smaller pre-IPO equity holdings, sell a great fraction of its pre-IPO holdings at the IPO date, exert less involvement in corporate governance and act as bridge investors.

Hence, holding constant IPO company's characteristics, insiders of IPOs backed by bank-affiliated funds' are more prone to moral hazard issues and lower level of monitoring conducted by PE/VC firms. In case PE/VC syndicates' ownership is driven

[25] Caselli *et al* (2010) classify PE ownership structures into the following five categories: corporate-owned, bank-owned, government-owned, other entity-owned and independent funds. Their analysis focuses on the universe of PE investments made by Italian closed-end funds from 1999 to 2005.

by the commitment hypothesis, I would expect the bank-affiliation dummy coefficient (β_5) to be positive.

2.3.2.4 Other Proxy Variables

The commitment hypothesis also yields predictions regarding alternative forms of certification: IPOs backed (underwritten) by more reputable PE/VC houses (investments banks) require less monitoring by PE and VC investors. In this paper, I use PE/VC house age at the IPO year as a proxy for financial sponsors' reputation, whereas global underwriters are classified as more reputable than their peers (Derrien and Kecskes, 2007). Hence, I expect to find β_6 and β_7 to be negative.

Consistent with prior literature, I use a number of other proxy variables to test the commitment hypothesis. Following Brau *et al* (2004), I include company's size as larger firms have more information available to investors/markets (Barry and Brown, 1984) and are followed by more analysts, which lead to less scope for moral hazard. However, Jensen (1986) argues that large firms are more likely to be mature, and, thus, subject to the free cash flow problem. To control for firms' growth opportunities, I use market-to-book ratio. I expect its coefficient β_{10}, and also the firm's size coefficient, β_9, to be negative, if PE and VC investors' ownership is driven by the commitment motive. I follow Hoque and Lasfer (2013) and include institutional ownership.[26] However, the previous literature provides conflicting results regarding institutional investors' ability, extent and effectiveness of monitoring. On the one hand, Chen *et al* (2000) report that institutional investors provide active, effective monitoring of companies and their ownership is positively related to performance. Cronqvist and Fahlenbrach (2009) also

[26] Hoque and Lasfer (2009) consider holdings above 3% of firm's shares at the time of IPO.

find that large block holders[27] have significant impact on US firms' corporate policies and performance. However, Faccio and Lasfer (2002) show that, in the UK, institutional investors do not monitor efficiently, and their ownership does not reduce asymmetric information between company's insiders and outsiders. I contribute to the literature by examining whether institutional shareholders monitor *financially sponsored* IPOs, where PE and VC syndicates represent an additional monitoring party. According to the commitment hypothesis, I expect firms with higher institutional ownership to face lower need for financial sponsors to retain shares for monitoring purposes, resulting in β_8 to be statistically significant and negative.

I test the signaling hypothesis by means of the following OLS multivariate regression (2), where the dependent variable is equal to the market-adjusted[28] buy-and-hold abnormal returns of financially sponsored IPOs:

$$\textit{Market-Adjusted BHARs} = \beta_0 + \beta_1 \textit{US Dummy} + \beta_2 \textit{PE Dummy} + \beta_3 \textit{PE/VC Ownership}_{t-1} + + \beta_4 \textit{Underpricing} + \beta_5 \textit{Size}_{t-1} + \beta_6 \textit{M/B}_{t-1} + \beta_7 \textit{Leverage}_{t-1} + \beta_8 \textit{Lock-Up Duration} + \beta_9 \textit{Underwriter Reputation} + \beta_{10} \textit{Management Ownership}_{t-1} + \beta_{11} \textit{Institutional Ownership}_{t-1} + \textit{Industry Dummies} + \textit{Year Dummies} + \varepsilon \quad (2)$$

I expect β_1 and β_2 to be negative if the holdings of UK sponsors and in VC-backed firms are more likely to signal the IPO future prospects. In case financial sponsors retain equity ownership post-flotation to signal to the market the firm's future great prospects, then I expect to find β_3 statistically positive. In addition, I also expect to find a non-linear relationship between PE/VC ownership and aftermarket performance of backed IPOs. Previous studies show that the impact of managerial ownership on firm value is non-linear (e.g. Faccio and Lasfer, 1999). In general, as managerial ownership increases, firm

[27] Cronqvist and Fahlenbrach (2009) consider private equity firms as one type of block holders.
[28] Given the two markets and the differences in characteristics between PE and VC-backed IPOs, I use the S&P 500 index and NASDQ index for US PE-backed and VC-backed IPOs, and FTSE All-Share index and FTSE AIM index for UK PE- and VC-backed IPOs, respectively.

value increases in line with the alignment hypothesis, but after a certain level (e.g. 19.68% in UK), the impact is reversed, consistent with the entrenchment hypothesis. In addition, Morck, Shleifer and Vishny (1988) document that the relationship between firm value and insiders' ownership is not linear. Hence, I examine whether the relationship between financial sponsors' ownership and firm value is non-linear by using PE/VC ownership and its squared value to capture this effect and to calculate the inflection point, the derivative with respect to $PE/VC\ Ownership_{t-1.}$ I also control for other factors documented in the previous literature to affect the long-run IPO performance (Levis, 2011).

In addition to these regressions, I use the calendar-time portfolio approach proposed by Mitchell and Stafford (2000) to calculate the average alpha. Each month (starting from January 1997), I form a portfolio of IPO companies. I rebalance this portfolio every month in order to add companies which had a flotation, and drop IPOs that reach the end of a holding period. I use the following holding periods: 12, 24 and 36 months. I, then, compute the portfolio monthly excess returns (equally-weighted) and regress it against the four factors (i.e. SML, HML, MOM, and $R_{m,t} - r_{f,t}$), which I obtain from Kenneth French's website.[29] Table 1 provides the definitions of the variables used in this paper, the hypotheses they proxy and their expected sign.

[Insert Table 1 here]

2.4 Empirical Results

Table 2 presents the annual and industry distributions of financially sponsored IPOs. The fluctuations in the number of IPOs resemble the trends documented by Ritter *et al* (2013)[30] who argue that this reflects the market timing considerations (Ritter, 2003).

[29] For the US (UK) sample, I use US (European) factors provided by Kenneth French.
[30] My reported annual distribution of backed IPOs in the UK is different from the one presented by Levis (2011). I exclude a number of IPOs, which are classified as PE- or VC- backed by BVCA or Liu and Ritter

As expected, Figure 1 shows that the total number of backed IPOs is significantly higher in the US than the UK. On average and excluding 2008 and 2009, where there are no single UK backed IPO, US backed IPOs are about 3.98 times those in the UK. The major difference in IPO activity between the two markets are concentrated in 1999 with 26.22 times and 2010 with 44 times US backed IPOs. The distribution of backed IPOs quoted in the UK is relatively more stable during the sample, as their standard deviation is 17.74, compared to 66.24 in the US. Significant increase in IPO activity in UK took place between 1999 and 2000, when the IPO growth rate totaled 311%, and between 1998 and 1999 in the US with 191% growth rate.

Over the sample period, VC-backed IPOs went through two noticeable peaks: the dotcom bubble of 1999 in the US and 2000 in the UK, with a growth rate in VC IPOs reaching 272% and 625%, respectively. The peaks of activity are followed by very few IPOs as a result of 2000 crash. Throughout the examined period the number of US PE IPOs is about 3.28 times the number of UK peers (Table 2). The annual distribution of PE-backed IPOs is more evenly spread, with an increased activity in 2004, when PE-backed IPOs' activity increased by 550% in the UK and 123% in the US in comparison to 2003.

Overall, in contrast to UK, the US IPO market had a quicker 'recovery' and financial sponsors continued to bring portfolio companies to the stock market to realize returns between 2008 and 2010. Table 2 demonstrates that both types of financing contribute equally to IPO activity in the UK throughout the sample period. In contrast, the main driver of financially sponsored IPOs' activity is time variant in the US. For

(2011), because I am unable to find post-IPO ownership data in Thomson One Banker. I also exclude some firms because electronic copies of IPO prospectuses are not available on Perfect Filings database. In addition, my study includes any additional backed-IPOs, which were floated after September 2005.

example, between 1999 and 2000 VC IPOs represented the prominent drivers of backed IPOs' activity, while in 2002 and 2005 PE-backed firms were the driving force.

Panel B provide the industry distribution of the sample firms.[31] In the UK, about half of financially sponsored IPOs in any industry are backed by venture capitalists. However, VC investors invest more heavily in high-tech, healthcare, and telecommunication industries in the US. Consistent with PE and VC investment criteria, PE firms' investments are predominantly concentrated in energy, non-durables and manufacturing sectors in the US. Presented different trends in the driving force of financially sponsored IPOs' activity and VC financing industry concentration between UK and US provide a strong incentive to compare the two major geographic stock markets.

[Insert Table 2 and Figure 1 and 2 here]

Descriptive statistics of PE- and VC-backed IPOs are presented in Table 3. The total sample is divided into two groups depending on whether PE and VC syndicates conducted a full exit, or retained some ownership at first ownership quarter post lockup expiration date. Retained and exited PE-backed IPOs in the US differ across a number of IPO firm and syndicate characteristics (Panel A). Exited PE-backed IPOs have longer financial sponsors' and managerial lockup durations, and a higher proportion is backed by PE sponsored with low proximity in comparison to retained peers. Also, consistent with my predictions, a higher proportion of more risky firms (i.e. financed by larger syndicates) and those backed by financial sponsors which tend to induce low level of monitoring (bank-affiliated funds) are retained by financial sponsors after the IPO. These findings are in line with the commitment hypothesis. Comparison of retained and exited PE-backed IPOs floated in the UK reveals that these firms differ with respect to

[31] The total number of IPOs presented in Panel A and B do not match up because the SIC code is not available for 66 UK and 4 US backed IPOs.

syndicate size: the median number of sponsors is 1 for exited compared to 2 for retained PE-IPOs in both UK and US.

In addition, Panel A provides statistical significance of the difference in means and medians between US and UK firms. A number of interesting differences between US and UK samples emerge. In particular, US IPOs are significantly larger, more profitable, and most are high-tech affiliated, but less likely to be underwritten by a global underwriter. In line with previous evidence (Brav and Gompers, 2003; Hoque and Lasfer, 2013), the average lockup duration applicable to PE/VC investors and managers is significantly longer in the UK than in the US, but there is no strong difference between exited and retained IPOs.

Moreover, retained samples in the US and UK differ along the several syndicate criteria. For example, PE funds involved in US quotations are significantly closer to their fund termination date (8.20 years) than their UK peers (6.40 years). It is likely that PE houses involved in US IPOs quote companies only when other divestment routes have proven to be unavailable (such as trade sale and secondary buyout). Alternatively, PE houses engaged in UK IPOs could be making distributions to LPs much sooner.

In addition, US retained IPOs are backed by larger funds (in term of the amount of capital committed), larger syndicates, and a higher proportion of these IPOs are backed by bank-affiliated funds with low proximity to portfolio company's headquarters in comparison to retained UK sample. These differences indicate that PE investors involved in US flotations are more inclined to make cross-border investments (and to remain committed to these firms post-flotation), and they do so in larger syndicates in order to reduce risk and/or get access to investment opportunities in other geographic regions (Lockett and Wright, 1999, 2001). Overall, these results imply that PE investors

target different types of firms in the two markets, and the differences in syndicate characteristics suggest that they conduct their investments via divergent mechanisms.

Panel B presents descriptive statistics of VC-backed companies. A number of characteristics seem to drive venture capitalists' decision to fully exit a US quoted portfolio company at the lockup expiration date. VC investors fully exit IPOs which use assets more efficiently in generating earnings (pre-IPO), and those with longer managerial and PE/VC investors' lockup durations. A higher proportion of high-tech and Nasdaq quoted firms are retained by financial sponsors, which are likely to need VC investors' expertise and continuous support post-IPO. In addition, syndicates led by a larger VC fund (in terms of capital committed) retain ownership in the post-IPO period, which could be the result of more available resources, and hence, greater ability to devote their time and effort to recently quoted companies for longer post-flotation. In terms of cross border investing, 29% (14%) of US retained (exited) sample is backed by a lead PE/VC fund located in another country than its portfolio firm. Lastly, a significantly higher proportion of retained US IPOs have been backed by larger syndicates (4.10 and 2.98 members, respectively). As before, the comparison of UK retained and exited VC IPOs reveals that IPOs with longer managerial lockup and those backed by smaller syndicates are exited.

VC investors provide financing to different types of firms in the UK and US. For example, US financial sponsors target more high-tech affiliated firms, which are subsequently quoted on the junior market. In addition, there are significantly more companies quoted on the junior market in the US than in the UK. This difference could be explained by the fact that financial sponsors in the US have developed expertise in 'nurturing' high-tech companies, as a result of well-established Silicon Valley and

existence of the NASDAQ market since 1971.[32] In contrast, the Alternative Investment Market (AIM) in the UK, which is the equivalent to NASDAQ market, and where smaller, high-tech, growing companies, and young firms with less than 3 years of trading statements can get a quotation, started operating only in 1995. In US deals, VC investors and managers are obliged to hold equity ownership for a longer time period than in UK. Moreover, VC-backed IPOs are usually backed by significantly larger syndicates.

Panel C provides differences in means and medians between PE and VC deals. Consistent with the prior studies (Levis, 2011) and the type of firms financial sponsors provide financing to, I find that in both geographic markets PE-backed IPOs are significantly larger, exhibit higher return on assets, more concentrated in non-high-tech industries, and more likely to be quoted on the main market in comparison to VC IPOs. Moreover, PE-IPOs are backed by funds with higher capital commitments to invest in more mature publicly quoted companies, and deals are done in smaller syndicates.

[Insert Table 3]

Table 4 provides descriptive statistics of ownership adjustments around the IPO date. The results are relatively in line with Cao (2011). Panel A provides statistics regarding PE-backed IPOs, whereas Panel B concentrates on the VC sample. Retained and exited IPOs floated on the US stock markets (Panel A, t-stat column differences) significantly differ with respect to financial sponsors' equity stakes around the corporate event. More specifically, in comparison to exited deals, PE sponsors hold a significantly higher proportion of the firm's shares in retained companies prior and after the IPO than in exited peers. PE sponsors and managers sell a considerable proportion of their pre-IPO equity stake at the IPO as demonstrated by t-stat row differences.

[32] Young firms predominantly quote on this market, where target investors are institutional buyers (Ritter, 2013).

In addition, retained IPOs have significantly lower institutional and management ownership pre/post-IPO than exited peers. Hence, PE investors voluntary retain ownership in US companies with worse alignment of interests (between managers and shareholders), as well as in those where less monitoring is conducted by other institutional investors. Significantly lower institutional ownership in retained IPOs also captures financial sponsors' preference to be the sole major block holder, which facilitates the implementation of various policy changes proposed by PE/VC funds.

Panel A shows that in UK PE-backed IPOs the ownership concentrations by various shareholders in retained and exited deals are very similar. Lastly, all the three types of shareholders take significantly higher ownership concentrations in US, than in UK, IPOs. The differences are especially large for financial sponsors. For example, in retained (exited) US IPOs, PE investors retain 48.62% (41.23%) of the firm's outstanding shares in comparison to 27.23% (13.79%) in VC deals.

Panel B reports similar ownership adjustments/dynamics in VC-backed IPOs. However, Panel C reports some differences between PE- and VC-backed IPOs. In particular, there is a clear preference for maintaining a significantly higher voting power by PE investors before and after the flotation, especially in the US. In general, other institutional investors prefer to take higher equity stakes in PE rather than in VC IPOs. Lastly, managers are given a significantly higher ownership in VC IPOs in order to align their interests with those of shareholders in more risky, high-tech and young companies.

Overall, the ownership concentration of various groups of shareholders is significantly different in US retained and exited IPOs, while it's more homogeneous in UK IPOs. In line with previous studies (Cao, 2011; Levis, 2011; Barry *et al*, 1990) financial sponsors realize only a part of their returns at the IPO date, while they still maintain a block ownership in the post-IPO period. PE investors have a distinctive

investment style: in comparison to venture capitalists, they prefer to hold a higher voting power in their portfolio companies. In sum, the results in Table 3 and 4 highlight significant differences between UK and US samples with respect to IPO firm and syndicate characteristics, as well as PE and VC investors' exiting intensity at the first opportunity (i.e. lockup expiration).

[Insert Table 4]

Table 5 presents results of a logit regression, where the dependent variable is equal to one if PE/VC syndicate retained some ownership after lockup expiration, and zero if financial sponsors sold all of the firm's shares. Thomson One Banker does not provide detailed fund reports for all VC and PE funds in my sample. Consequently, I could only find data on 1727 PE/VC funds covering 157 UK and 869 US IPOs. I introduce syndicate/fund characteristics in a separate regression. However, for some regressions the number of observations is too low to obtain results (e.g. Model [4] and [10]).

Models [1] and [2] include all backed UK and US IPOs. I find that financial sponsors involved in US quotations are significantly less likely to retain ownership immediately after the lockup expiration date than in UK IPOs. PE and VC investors exhibit similar propensity to conduct a full divestment. Results of Model [1] and [2] suggest that financial sponsors are more likely to retain shares in IPOs which are larger, high-tech affiliated and backed by larger syndicates. Hence, PE and VC investors tend to maintain some ownership in firms which are more complex, risky, those which operate in fast-paced and niche industries, where continued involvement by financial sponsors is particularly valuable. Whereas, the following characteristics have a negative impact on financial sponsors' propensity to retain shares: duration of financial sponsors' lockup restrictions, institutional ownership, return on assets and underpricing. In other words,

financial sponsors who are unable to realize returns for a longer time period in more successful firms, which already have a monitoring agent, are unlikely to retain their ownership voluntarily.

Model [3] indicates that PE investors' exit propensity at the unlock day is significantly affected by leverage and syndicate size: PE funds are more likely to retain ownership in more levered IPOs and those backed by larger syndicates, which is consistent with my prediction. This finding suggests that PE sponsors do not simply amplify the firm's debt and divest at the first opportunity, but rather they ensure that companies are able to meet their financial obligations.

In contrast, Models [5] and [6] show that VC funds are less likely to retain voluntarily their holdings in the US with higher institutional ownership, first day returns, lockup duration, leverage, syndicate size and low proximity. In contrast, they are more likely to retain voluntarily ownership when their pre-flotation holding is high, and in larger and high-tech IPOs. The inclusion of fund specific variables in a separate regression substantially increases the explanatory power of the model from 27.47 to 40.10%.[33]

Models [7] to [9] show, however, that the drivers of ownership retention are not homogeneous across the US and UK markets. In the UK, the decision to retain shares is negatively affected by lockup duration, but positively related to first day returns and syndicate size. These results suggest that financial sponsors with longer lockup duration are eager to realize returns and sell all of their equity stake at the unlock day, whereas financial investors in more underpriced and more risky IPOs, as captured by the syndicate size, are likely to retain shares in the post-flotation period, implying the IPOs'

[33] I include the fund specific variables in a separate model because it reduces the sample size.

riskiness and the need to make distributions to LPs affect financial sponsors' selling intensity at the IPO or lockup expiry dates.

In contrast, a wider spectrum of factors affects PE and VC investors' equity retention in US IPOs. Institutional differences between the two markets are important. In the US, where block ownership is less wide spread, I find that financial sponsors in IPOs with higher institutional ownership concentration are less likely to retain the firm's shares. Also, in IPOs with higher ROA and in those with an additional monitoring/disciplinary mechanism in place (i.e. higher leverage), financial sponsors are less likely to maintain an equity ownership. Moreover, PE/VC pre-IPO ownership, size and high-tech affiliation increase the probability of financial sponsors' voluntary ownership.

[Insert Table 5]

There are three major time events when pre-IPO shareholders can fully or partially divest: IPO date, lockup expiration date, and thereafter. So far, I have presented descriptive statistics and multivariate analysis of the first two cases. Figures 3 through 6 demonstrate divestment dynamics of financial sponsors with a clear differentiation between compulsory and voluntary equity holdings post-flotation in US and UK markets.[34]

Figure 3 shows that, on average, PE sponsors hold 38.87% of the US quoted firm's outstanding shares in the first quarter post-flotation, significantly higher than the 7.81% observed in the UK. Unlike in the UK where the ownership remained relatively stable, in the US it decreases steady though time reaching 13.19% in the twelfth quarter. Nevertheless, PE investors voluntary maintain a significantly higher ownership in US

[34] On Figures 3 through 6, statistical significance of the difference in means between UK and US samples are denoted by ***, **, * which represent significance at 1, 5, and 10 percent levels, respectively. Information depicted in the four graphs is also presented in a table format in Appendix 1. Appendix 2 presents t-stats of the difference-in-means.

deals than in UK ones, which is consistent with my prediction, thereby confirming that different institutional frameworks in US and UK have a material impact on the post-IPO involvement of financial sponsors.

Figure 4 illustrates the average VC groups' holdings in portfolio firms. On average, VC sponsors retain 15% of firms' shares post-quotation.[35] In the first four quarters, VC sponsors retain more in the US than in the UK. In quarter 5 to 7, the ownership is relatively similar across the two countries, as US sponsors appear to have divested while their UK counterparts accumulated ownership. In quarters 8 to 12, both sponsors appear to have divested progressively their holdings. Differences-in-means suggest that VC investors in UK and US pursue similar divestment strategies of their voluntary holdings in the post-quarter 5 period.

Figure 5 presents summary statistics of compulsory holdings in PE deals.[36] On average, underwriters require PE sponsors to retain 31.30% of US and 18.76% of UK backed firm's shares. In line with my predictions, underwriters require financial sponsors to retain higher equity in US markets, which are characterized by more dispersed ownership base without a clear block holder, which calls for higher need of monitoring to be conducted by PE and VC investors. In contrast, Figure 6 shows that VC sponsors hold 22.62% in US IPOs, and 21.62% in UK deals in the first two quarters. However, in quarter 3 and 4, the VC ownership is significantly lower in the US, suggesting that in

[35] Initially, I expected to find a smooth divestment dynamic by venture capitalists in the post-flotation period. However, as illustrated in Figure 4, the average voluntary holdings in the first two quarters post-flotation are lower than the subsequent ones. This is explained by the fact the vast majority of venture capitalists are locked-up for 180 days post-flotation. Hence, what I am capturing in the first 2 quarters of voluntary data is only a small, unique number of firms in which financial sponsors were not obliged to hold shares, and they chose to hold relatively small block holdings. But as the lockup agreements expire (quarter 3), more VCs voluntary retain shares.

[36] For US deals there are no observations in quarter 5 and 6 because by that time all lockup agreements applicable to financial sponsors expire.

unusually long lockups in the US[37] financial sponsors are required to hold significantly less shares than in UK IPOs.

Table 6 presents differences-in-means between PE and VC ownership. The results indicate that, unlike the UK where PE and VC funds retain relatively similar holdings, in the US PE investors are likely to retain significantly higher ownership than VC funds. These results apply to both voluntary and compulsory ownership and can be explained by two factors. First, VCs primarily maintain and exert control by means of their representation on the board of directors (Celikyurt *et al*, 2014), whereas PE investors demonstrate their control via block holdings. In addition, PE firms' expertise in supporting and monitoring mature firms lead to value creation even post-flotation. Therefore, PE investors' expected benefits associated with continued post-IPO monitoring potentially outweigh the costs; as opposed to VC houses, which specialize in pre-IPO financing. These factors do not, however, apply to UK IPOs, where PE and VC investors choose similar divestment strategies.

[Insert Table 6 and Figure 3-6 here]

I also examine PE/VC syndicates' *voluntary* ownership evolution of two distinctive groups of IPOs: those in which PE/VC syndicates are subject to and free of lockup agreement. Table 7 presents summary statistics of *voluntary* ownership of these two groups in UK IPOs.[38] In spite of the negative impact on IRR (as a result of a longer holding period), both PE and VC investors voluntary retain significantly higher ownership in IPOs where they have been subject to some selling restrictions. This could partially be explained by the fact that PE/VC syndicates avoid sending a negative signal to the market by making dramatic ownership reductions soon after the lockup expiration.

[37] The average lockup period in US sample is 180 days (i.e. two quarters post-flotation).
[38] For IPOs with no PE/VC lockup, all twelve quarters of ownership evolution is considered as voluntary. However, for IPOs with PE/VC lockup, only ownership holdings post lockup expiration are regarded as voluntary. For Table 7, only UK flotations are considered because almost in all US backed IPOs financial sponsors are subject to lockup agreement.

Overall, these results suggest that PE and VC investors in UK IPOs do not view lockup expiration as an opportunity to fully realize their returns, but rather they only make partial adjustments to their holdings, while maintaining their ability to exert a great influence on the firm's policies as a major post-IPO block holder. My findings are consistent with Furth and Rauch (2012), who report that it is very rare for buyout sponsors to sell shares at or within four weeks of the lockup expiration date.

[Insert Table 7]

Table 8 presents results of the multivariate analysis of financial sponsors' compulsory (Panel A) and voluntary (Panel B) holdings. I investigate whether PE/VC investors' ownership is driven by the same explanatory variables as the IPO firm matures by examining ownership in various quarters post-flotation. The results show that, in line with my prediction, the underwriters require PE investors in the US to hold significantly higher compulsory ownership, compared to the UK. This cross-country difference can be related to the dispersed US ownership structures, and hence, in order to have a significant impact on corporate policies and to reduce moral hazard, financial sponsors are required to maintain a significantly higher block ownership.

The results indicate that financial sponsors retain less shares in IPOs in which they sold a higher proportion of their pre-IPO equity. Compulsory holdings in PE and VC IPOs are negatively affected by lagged institutional ownership, which actively monitor insiders' actions. This finding supports the commitment hypothesis and is in line with past studies, which document institutional investors' active and effective monitoring investment style (Chen *et al*, 2010). In line with the commitment hypothesis, I find that financial sponsors' firms with higher market-to-book ratio are required to retain less shares in the post-flotation period.

In contrast to my initial expectation, I find that that size is positively related to PE compulsory ownership. I expected underwriters to require retaining less shares is larger firms, which are more known to the market participants and followed by a higher number of analysts. However, this variable could partially capture the complexity of the firm's operations and the managers' ability to take advantage of it for their own benefit.

The results indicate that the underwriter's reputation does not have an impact on compulsory ownership of PE sponsors, in contrast to Brav and Gompers (2003) who find that IPOs underwritten by more reputable sponsors have shorter lockup duration and are more likely to be released from lockup restrictions early. I believe this difference can be attributed to a number of factors. First, I use an updated time period[39] during which the industry has experienced two boom and busts, which potentially diminished the effect of the underwriter reputation on terms of lockup agreements and forced all underwriters (of various reputations) to impose more homogeneous lockup restrictions. Second, Brav and Gomper (2003) consider firms' insiders as one class, without differentiating between the lockup terms applicable to managers and other pre-IPO major institutional shareholders. My analysis focuses exclusively on the sub-set of insiders, as I analyze the terms of financial sponsors' lockups. Lastly, although Brav and Gompers (2003) find that the underwriter reputation has an impact on some aspects of lockup agreements, namely the likelihood of early release from lockup agreements and duration of lockup length, their study does not shed light on the relationship between underwriter reputation and initial PE/VC investors' ownership retention post-flotation.

In addition, I find that VC compulsory ownership is positively affected by several other variables such as syndicate size and low proximity. These findings imply that underwriters lock-in financial sponsors in more risky firms, and those whose monitoring

[39] The study by Brav and Gompers (2003) is based on 1988-1996 time period, whereas I examine the financial sponsors' divestments via an IPO route during 1997 and 2010.

abilities are constrained by distance, in line with my initial predictions. Also, underwriters impose less strict lockup clauses on VC-backed IPOs, those underwriter by a global investment bank, and those which higher return on assets.

Panel B resents results on the multivariate analysis of voluntary ownership. I find that the market of quotation only matters for compulsory ownership, and hence, financial sponsors pursue a similar divestment strategies of voluntary holdings in UK and US IPOs.

The results indicate that bank-affiliated PE investors voluntarily retain significantly less equity in the post-IPO period than their peers with other ownership structures. These findings are consistent with previous studies which show that these financial sponsors are bridge-investors who invest in portfolio firms to primarily form relationships for future debt facilities (Tykvova, 2007; Hellmann *et al*, 2004). The fact that bank-affiliation dummy is only significant in PE deals reinforces this argument since PE-backed IPOs use leverage to a greater extent than VC-IPOs (Levis, 2011). I find that PE investors reduce their voluntary holdings at times subsequent to strong portfolio firm's performance, as the coefficient of $CARs_{t-1}$ is statistically significant at 5% level in Model [5].

The results also indicate that VC funds tend to hold higher voluntary holdings in more risky firms (i.e. those backed in larger syndicates) and in those with low proximity. However, in the third year post-flotation VCs tend to retain significantly less shares in firms located in remote areas. This could be driven by the fact that venture capitalists have limited resources, and after two years of continuous post-IPO support, they find it too costly to remain involved in firms, and free up their managers for new ventures. In addition, I find that VCs retain less shares in larger IPOs and in those with higher institutional ownership, which is consistent with my initial expectations. Overall, the

results reported in Table 8 suggest that compulsory and voluntary holdings of financial sponsors are driven by the commitment hypothesis.

[Insert Table 8]

In Table 9, I analyze financial sponsors' holdings in US and UK IPOs separately in order to shed light on whether institutional differences have an impact on the ownership concentration. I demonstrate that drivers of compulsory ownership in these two countries are different. For example, in Model [2] and [3], PE dummy and size have statistically significant positive effects on compulsory ownership in US quotations, whereas there is no impact on ownership evolution in UK firms.

I find that underwriters impose tighter lockup restrictions on financial sponsors in US IPOs with lower post-IPO institutional blockholder (or IBH) ownership, whereas I do not find a significant relationship between IBH ownership and financial sponsors compulsory holdings in UK firms, where the main shareholder type is institutional investors, while, in the US, it is individual investors. Hence, in cases when US IPOs have outside monitoring agents, i.e. higher institutional block holder ownership, underwriters require financial sponsors to retain less shares in US firms. In contrast, Model [3] shows that the coefficient of $INST\_OWN_{t-1}$ is not significant in UK, because underwriters expect firms to have outside institutional investors in firms post-flotation anyway, and hence institutional ownership does not impact the terms of lockup agreements applicable to PE/VC investors. I also report that low proximity has a statistically significant positive (negative) impact on financial sponsors' compulsory ownership in US (UK) IPOs.

My cross-country analysis of voluntary ownership drivers (Model [4] to [6]) reveals that financial sponsors involved in US (UK) IPOs which are underwritten by more reputable investment banks voluntarily retain higher (lower) equity holdings post-flotation. This finding coupled with PE/VC house age's negative coefficient in Model [6]

supports the commitment hypothesis, and suggests that other forms of certification and reputation are viewed as alternative commitment devices in the UK, but not in the US.

I find institutional ownership to have a significant negative impact on financial sponsors' voluntary ownership in both countries of quotations, which provides support for the commitment hypothesis. In addition, my results show that ROA, size and PE/VC fund's bank affiliation only have significant negative effects on financial sponsors' voluntary ownership evolution in the UK. In sum, I find that different institutional frameworks in the US and UK have significant implications for financial sponsors' compulsory and voluntary post-IPO ownership evolutions.

[Insert Table 9]

The signaling hypothesis is tested by means of a multivariate analysis of the market-adjusted buy and hold abnormal returns (BHARs). The results are presented in Table 10. On average, US backed IPOs underperformed UK peers during the examined sample period. I find that PE-backed IPOs' aftermarket performance is superior to the one demonstrated by VC companies (Model [1]), in line with Ritter (2014) who reports US PE (VC)-backed IPOs' average market-adjusted 3-year BHARs to be 5.7% (-11.4%).

More importantly, Models [1] and [3] indicate that the coefficient of interest, lagged PE group ownership, is negatively related to long-run performance suggesting that PE sponsors' retention does not signal portfolio firm's future great prospects to the market, but rather it is indicative of future performance deterioration. Hence, this finding provides weak support of the signaling hypothesis, however rejection of the expected sign. In separate regressions (Model [2], [4] and [6]), I add an additional squared variable to examine the relationship between firm performance and financial sponsors' voluntary ownership. I find that my coefficients of interest (PE/VC_OWN_{t-1} and $PE/VC\_OWN_{t-1}^2$) are significant in Model [2], which uses pooled data for UK and US IPOs. By taking the

derivative with respect to PE/VC_OWN$_{t-1}$, I am able to calculate the inflection point which equal to 1.83% for all backed IPOs,[40] and the relationship between BHARs and financial sponsors' voluntary ownership is convex.

These results are consistent with previous studies which report that the relationship between firm value and insiders' ownership is not linear (Morck, Shleifer and Vishny, 1988). For example, the relationship between firm value and managerial ownership is a concave shape and the inflection point is about 40%. My finding, the U-shaped relationship, suggests that PE/VC group's voluntary ownership is positively related to corporate value when financial sponsors' equity holding exceeds 2%, while it is negative when they hold less than 2% of the firm's shares. In other words, when interests of PE and VC firms are more closely aligned with those of other shareholders by means of higher equity holding (as well as higher proportion of unrealized returns), financial sponsors are motivated to monitor, support and create value post-flotation. The continued PE/VC involvement is associated with higher BHARs. In contrast, by realizing a significant part of PE/VC investors' returns and retaining a small equity holding (below 2%) post lockup expiration,[41] PE and VC firms do not benefit as much from costly monitoring, since they will only capture the wealth gains on a small portion of their initial ownership. Hence, in contrast to managers who become entrenched and their higher (above certain level) ownership results in firm value deterioration, higher equity financial sponsors' ownership is positively associated with firm performance.

My results are related to several studies (Pound, 1988; McConnell and Servaes; 1990), which find a significant positive relationship between firm value and fraction of

[40] The inflection points are calculated as a solution to the following equation in Panel D:
BHARs = -0.44*(PE/VC_OWN$_{t-1}$) + 0.12*(PE/VC_OWN$_{t-1}$)^2
I differentiate BHARs with respect to PE/VC_OWN$_{t-1}$,
δBHARs /δ PE/VC_OWN$_{t-1}$= -0.44+ 0.12*(PE/VC_OWN$_{t-1}$)
I let the above equation equal to zero and solve for PE/VC_OWN$_{t-1}$.

[41] In this case, only a small portion of initial ownership is dependent on the share price at the time of PE/VC investors' full exit after the flotation.

shares held by institutional investors, however non-existence of a significant relationship between firm value and ownership by block holders. This is consistent with my results because PE and VC firms represent a special type of institutional investors with specialized knowledge, active, hands-on investment style and monitoring abilities. In contrast to other institutional block holders, who vote with their feet and implement a passive monitoring style, PE and VC investors have reputational capital at stake which they aim to preserve. Overall, my study contributes to the existing literature by reporting that the ownership structure of backed IPOs has an important influence on corporate value regardless of managers' ownership position.

In addition, I find that financially sponsored IPOs' performance is negatively related to lockup duration, while positively affected by lagged management ownership, which is consistent with the alignment of interest argument. Also, size coefficient is statistically significant at 1% level in all models.

[Insert Table 10]

Table 11 reports results of the four factor model. The coefficient of interest is the intercept (alpha), which represents the *average* monthly abnormal return for portfolio of backed IPOs. After controlling for market, size, book-to-market and momentum I find that financially sponsored IPOs have performed worse than expected. For example, the alpha for PE (VC) sample is -1.09% (-2.67%) per month and statistically significant. This finding is consistent with previous empirical studies (Ritter, 1991; Levis, 1993) which demonstrate clear patterns of long-run underperformance of IPOs (including financially sponsored firms). I report that the loadings of four factors partially explain backed IPOs' performance: SMB, HML, R_m-r_f have significant positive relationships with excess returns. The results also indicate that PE-backed IPOs seem to have higher exposure to HML factor than VC IPOs.

Models [4] to [7] show that alpha is negative independently of whether financial sponsors exited or retained their holdings. For the exited sample, the alpha for PE (VC) sample is -1.36% (-2.60%) per month and statistically significant, while the average alpha for retained PE (VC) is -1.10% (-2.85%) per month. In Appendix 3, I present results for 12 and 24 months' holding periods. Hence, PE and VC investors' ownership concentration immediately post lockup expiration *per se* does not seem to lead to firms' long-run outperformance in the aftermarket. However, one should interpret this finding carefully and not assume that financial sponsors' ownership is not beneficial for firm value in the long-run. It is not the mere PE and VC investors' equity holding which could create value but rather financial sponsors could use their equity ownership as a lever to shape various corporate policies and create value for shareholders in the post-flotation period.

In addition, I present results of the four factor model for backed IPOs in which financial sponsors voluntary retained some equity stake throughout 36 months post-flotation. Results suggest that HML and momentum factors are not statistically significant explanatory variables for these firms. Overall, backed-IPOs underperform in the long-run, and momentum does not explain their excess returns.

[Insert Table 11]

To deal with the endogeneity concern, I use an instrumental variable approach. In line with Bruton *et al* (2010), I instrument financial sponsors' syndicate ownership by syndicate size, which presumably affects the financial sponsors' equity ownership without depending on the firm's aftermarket performance The results are presented in Table 12. The choice of instrumental variable is judicious since it is strongly associated with PE/VC post-IPO equity ownership (Model [1] and [3]). The two-stage least-squares estimation results provide support for my earlier findings.

[Insert Table 12]

2.5 Conclusion

Private equity and venture capital investors realize returns by bringing their portfolio companies to the stock market (or any other divestment route) after several years of extensive restructuring, supporting, monitoring and value creation. Previous studies have documented PE and VC investors' continued involvement in companies post-flotation in terms of ownership and representation on the board of directors (Cao, 2011; Krishnan *et al*, 2011). This paper sheds lights on the fundamental question of what determines PE/VC compulsory and voluntary ownership retention, and its effect on the long-run performance of UK and US backed IPOs. The extent of exit post the lockup expiration date is of particular interest, since it is the first opportunity for PE and VC syndicates to voluntarily decide on their divestment strategy.[42]

Cross-country comparison suggests that PE investors involved in US flotations are obliged to maintain a significantly higher ownership immediately post-flotation, which is explained by the different institutional frameworks in the two geographic markets of quotation. In addition, underwriter and PE/VC house reputations are considered to be alternative commitment devices only in the UK. I find that syndicate size and geographic proximity of VC house to investment firms have significant effects on voluntary and compulsory financial sponsors' holdings in both countries.

The comparison of exited and retained IPOs suggests different ownership adjustments dynamics conducted by various pre-public investors around the US quotations: on average, retained IPOs have higher (lower) PE/VC (managerial and institutional) ownership than exited peers. I present evidences that financial sponsors'

[42] Although PE and VC investors sell some shares at the IPO date, this decision is heavily influenced by the underwriter. In contrast, following the lockup expiration date PE and VC investors are no longer obliged to hold shares and are free to decide whether to sell all or some of the company's shares.

compulsory and voluntary holdings are driven by the commitment hypothesis. Hence, PE and VC post-IPO ownership is used to alleviate moral hazard concerns.

I differentiate between two events at which financial sponsors can adjust their *voluntary* equity holdings: at the lockup expiration date and thereafter. I find that good operating performance enables PE and VCs to exit fully US firms at the lockup expiration. Hence, financial sponsors commit their resources and retain ownership in underperforming firms. Moreover, financial sponsors involved in US flotations are more likely to sell their entire equity stake at the unlock day. Examination of financial sponsors' ownership following the unlock day provides support for the commitment hypothesis.

My results provide partial rejection of the signalling hypothesis. Continued financial sponsors' signals future firm performance, however, in contrast to my initial expectation it is indicative of poor future performance. I find that PE-backed companies with higher PE ownership in the post-IPO period underperform in the aftermarket. I demonstrate that backed IPOs underperform the market in the long-run, which is heavily driven by the VC and US sub-samples. Lagged management ownership and size have a positive effect on backed IPOs' long-run performance, while lockup duration has a significant negative effect. Using the calendar-time approach, I report negative average monthly abnormal returns for a portfolio of backed IPOs over various holding periods.

The results have several important implications for investors in private equity, general partners, shareholders, and other market participants. Potential investors in private equity and venture capital industries should take into consideration the fact that some types of financial sponsors undertake a more prolonged divestment routes. Despite the fact that investments in PE is long-term (i.e. LPs commit capital for the duration of a

fund life, which is usually ten years), they should be aware that an IPO conducted by PE or VC investors does not immediately result in cash distributions to LPs.

Moreover, in certain IPOs backed by larger syndicates, and located in another country than VC investors' headquarters, exhibit a distinctive exit behavior: they retain a higher ownership concentration post-flotation. In addition, other financial sponsors' characteristics (e.g. bank-affiliation and PE/VC house age) significantly influence equity holdings post-IPO in the UK. Hence, LPs should be aware and be prepared that following an IPO of a portfolio firm, it will take longer for some types of financial sponsors to start making cash distributions. This provides an even greater incentive for LPs to choose carefully the PE/VC houses they invest in based on how long they are willing to wait to start realizing returns.

General partners of funds which are close to the termination date should consider the market of flotation carefully because it affects the strictness of lockup restrictions applicable to PE/VC investors. For example, investment banks require financial sponsors to retain more shares in companies floated on the US stock market in case it is located in another country than PE/VC investors' headquarters; in the UK, it's the opposite. Financial sponsors could lighten (to an extent) their lockup agreement by bringing in more institutional shareholders (i.e. higher institutional ownership) pre-flotation in US quotations. Finally, my study contributes to the existing literature by reporting that the ownership structure of backed IPOs has an important influence on corporate value regardless of managers' ownership position, which is used to align the interest of shareholders and managers.

As all research, this paper has several limitations. The fact that some of my results are consistent with the commitment hypothesis while the excess returns indicate that voluntary retention does not create value calls for further research. The results

suggest that PE and VC funds are not very effective monitors as they do not necessarily lead companies in which they hold large stakes into higher performance. My results could suggest that while they retain their holdings in IPOs that originally need monitoring, they are not able to derive shareholder value partly because these IPOs are relatively similar to other non-backed IPOs, and their underperformance could be due to other factors, such as their relative risk. Further research could exploit the relationship between monitoring and signaling. In addition, presented findings do not imply that financial sponsors are completely unable to add value in the long-run since it's not necessarily the financial sponsors' ownership per se which affects the portfolio firms' performance, but rather corporate policies which they shape by means of continued equity holdings.

My analysis concentrates on two 'Anglo-Saxon' markets of quotation. A further examination of whether documented PE and VC firms' retention dynamics and drivers are wide-spread in other Western European counties (characterized by different institutional frameworks, more concentrated ownership and various level of activism for corporate control) could prove to be fruitful. Second, a more comprehensive ownership dataset (in terms of frequency) would allow to examine to what extent presented results alter or strengthen. I believe that this would not have a material impact on results because I base my examination of ownership adjustments made in first ownership quarter post the unlock day (as opposed to an exact lockup expiration date), which would only overstate PE/VC firms' propensity to conduct an exit.

This study does not fill all the gaps in the existing literature, and gives rise to several other potentially fruitful research areas such as when exactly does PE and VC firms' involvement terminate fully in the post-IPO period. I find that at the end of the third year post-flotation, financial sponsors still maintain some equity holding in 53.74%

(52.37%) of PE (VC)-backed IPOs. Hence, the vast majority of financial sponsors do not list companies to fully divest, but rather they prefer to lock in only a part of their returns and remain a block holder in the post-IPO period. It is of interest to examine whether such long holding periods of firms is driven by the prevailing less favourable valuations. In addition, it will be interesting to investigate whether documented PE/VC involvement and monitoring apply to other divestment routes.

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Tables for Empirical Study 1

Table 1. Description of Variables.

Variables	Definition	Proxying for (Hypotheses)	Esign
PE/VC OWN	PE/VC syndicate's ownership: The percentage of outstanding shares held by financial sponsors as a group at time t (t = one day pre and post IPO, quarterly ownership post-flotation for three years).		
SIZE	The natural logarithm of market value of equity is calculated at the first day post-IPO, and quarterly for 12 quarters post-IPO.	Commitment	-
INST_OWN	Institutional Ownership: The percentage of outstanding shares held by institutional investors as a group at time t (t = one day pre and post IPO, quarterly ownership post-flotation for three years).	Commitment	-
UND. REP	Underwriter Reputation: Dummy variable equals 1 if the underwriter is the global underwriter, 0 otherwise as defined in Derrien and Kecskes (2007).	Commitment	-
PE/VC HOUSE AGE	The natural logarithm of one plus the difference between time t and PE/VC house founding year (t = IPO year, quarter 4, 8 and 12 post-IPO).	Commitment	-
BANK_AFF	Bank Affiliation: Dummy variable equals 1 if fund investor type is an Investment Bank or Other Banking/ Financial Institution, and 0 otherwise (Corporate PE/Venture Fund, Evergreen, Independent Private Partnership, and Investment Advisory Affiliate).	Moral hazard and level of monitoring	+
LOW PROXIMITY DUMMY	Dummy variable equals 1 if PE or VC fund's headquarters and IPO company are located in different countries (i.e. low geographic proximity dummy), and 0 otherwise.	Level of monitoring	+
SYND. SIZE	Syndicate Size is calculated as the natural logarithm of one plus the number of PE/VC investors pre-IPO. 'Major Shareholders' section of prospectuses was examined in order to identify the number of different PE/VC investors who held a block ownership immediately prior to an IPO.	Firms' moral hazard and riskiness	+
PE/VC FUND AGE	The natural logarithm of one plus the difference between time t and PE/VC fund founding year (t = IPO year, quarter 4, 8 and 12 post-IPO).		
ROA	Return on Assets: The ratio of earnings before interest and tax over total assets (%).		
MGT_OWN	Management Ownership: The percentage of outstanding shares held by the management/directors as a group at time t		

	(t = one day pre and post IPO, quarterly ownership post-flotation for three years).
CARs	Cumulative abnormal returns are calculated between the IPO date and time t. For companies listed on the MAIN or NYSE (AIM or NASDQ) markets, FTSE All-Share or S&P 500 price index (AIM All-Share or NASDQ All-Share) are used correspondingly in order to calculate the market model abnormal returns (t = first quarter post the unlock day, quarter 4, 8 and 12 post-IPO).
LEV	Leverage is calculated as total debt divided by total assets.
FDR	First day Return (Underpricing) is calculated as the ratio of the difference between closing price at the first day of trading and offer price, divided by the offer price.
M/B	Market-to-Book Ratio is calculated as the market value of equity divided by book value.
US DUMMY	Dummy variable equals 1 if the company is floated on the US stock markets, and 0 otherwise.
PE DUMMY	Dummy variable equals 1 if the IPO is classified as Private-Equity Backed, and 0 if VC-backed.
HIGH-TECH DUMMY	Dummy variable equals 1 if the company belongs to one of the following industries: technology, health care, and telecommunications, and 0 otherwise. For industry dummies in regressions, Fama-French industry classification is used.
PE/VC_OWN_POST_LUED	PE/VC syndicate's ownership in first quarter post lock-up expiration date. The duration of lock-up agreements is either gathered from prospectuses or SDC Platinum.
PROP_INIT_PEVC_OWN_SOLD	Proportion of initial PE/VC Ownership sold at IPO is calculated as the ratio of the difference between post-IPO PE/VC syndicate ownership and syndicate ownership pre-IPO, divided by pre-IPO syndicate's ownership.
BHARs	Market-adjusted buy and hold abnormal returns: I compute IPO company’s one/two/three year buy-and-hold return and subtract one/two/three year market buy-and-hold return. For companies listed on the AIM and NASDQ (MAIN and NYSE) markets, AIM All-Share and NASDQ All-Share price index (FTSE All-Share and S&P 500 price index) are used to calculate market buy-and-hold return, correspondingly.
JUNIOR MARKET DUMMY	Dummy variable equals 1 if the company is quoted on the Nasdaq or AIM market, and 0 otherwise.

Table 2. Annual and Industry Distributions of PE- and VC-backed IPOs.

For the UK sample, classification of IPOs which are quoted between Jan 1997 and Dec 2004 into PE and VC-backed samples is done according to the British Private Equity & Venture Capital Association classification. For IPOs quoted between Jan 2005 and Dec 2010, I examine each prospectus separately and check Unquote, an online trade publication which provides regular details on individual VC and buyout transactions. For the US sample, the names of PE and VC-backed IPOs which are quoted between Jan 1997 and Dec 2007 are gathered from Liu and Ritter (2011). The names of backed IPOs, which are quoted between 2008 and 2010, are collected from SDC Platinum Database. *Panel A* reports annual distribution of backed IPOs in the US and UK. *Panel B* reports industry distribution based on Kenneth-French industry classification. In Panel A (B), % VC is calculated as the number of VC-backed firms in a particular year (industry) divided by the number of PE and VC IPOs in that year (industry). US/UK is calculated as the ratio of US and UK IPOs in a particular year or industry.

Panel A. Annual Distribution

	UK Backed IPOs			US Backed IPOs				
Year	PE	VC	% VC UK	PE	VC	%VC US	PE US/UK	VC US/UK
1997	13	25	66%	28	105	79%	2.15	4.20
1998	10	14	58%	27	54	67%	2.70	3.86
1999	5	4	44%	35	201	85%	7.00	50.25
2000	8	29	78%	32	183	85%	4.00	6.31
2001	4	8	67%	22	22	50%	5.50	2.75
2002	7	6	46%	22	12	35%	3.14	2.00
2003	4	4	50%	21	19	48%	5.25	4.75
2004	26	18	41%	47	58	55%	1.81	3.22
2005	17	29	63%	60	46	43%	3.53	1.59
2006	21	31	60%	66	53	45%	3.14	1.71
2007	20	22	52%	31	71	70%	1.55	3.23
2008				6	9	60%		
2009				15	13	46%		
2010	1	1	50%	34	54	61%	34.00	54.00
Total	136	191	58%	446	900	67%	3.28	4.71
Average	11.33	15.92	56%	31.86	64.29	59%	6.15	11.49
St. dev.	8	11.14	0.11	16.42	60.42	0.16	8.92	19.05

Panel B. Industry Distribution

Non-Durables	9	6	40%	22	6	21%	2.44	1.00
Durables	1	1	50%	10	4	29%	10.00	4.00
Manufacturing	10	14	58%	49	15	23%	4.90	1.07
Energy	7	5	42%	20	4	17%	2.86	0.80
Hi-Tech	31	57	65%	88	463	84%	2.84	8.12
Telecommunications	4	3	43%	25	46	65%	6.25	15.33
Shops	14	9	39%	60	42	41%	4.29	4.67
Healthcare	10	31	76%	29	202	87%	2.90	6.52
Other	27	20	43%	141	114	45%	5.22	5.70

Table 3. IPO and Syndicate Characteristics.

The sample consists of 327 UK and 1346 US-backed IPOs from January 1997 thought December 2010. All accounting figures are gathered from the last annual accounts pre-IPO. *Panel A* (*B*) presents summary statistics of PE- (VC-) backed IPOs in US and UK, divided into whether financial investors' syndicate has fully exited or retained some ownership in the first quarter post lockup expiration date. Statistical significance of the difference in means and medians between US and UK backed IPOs are reported in the first four columns by [a], [b] and [c], which denote statistical significance at the 1, 5, and 10percent levels, respectively. In column [1], [a], [b] and [c], refer to the statistical difference between retained US and UK IPOs ([1]-[3]). In column [2], [a], [b] and [c], refer to the statistical difference between exited US and UK IPOs ([2]-[4]). The same applies to Panel B. *Panel C* presents difference-in-means and medians between US and UK samples. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. PE-Backed IPOs												
	Retained [1]		Exited [2]		Difference [1]-[2]		Retained [3]		Exited [4]		Difference [3]-[4]	
	Mean	Median	Mean	Median	t-stat	MW	Mean	Median	Mean	Median	t-stat	MW
	US						**UK**					
a) IPO Characteristics:												
No. of IPOs.	339		109				106		32			
Total Assets ($mil)	856.32[a]	349.9[a]	551.61[c]	244.72[a]	1.56	[0.19]	247.39	31.59	149.06	33.24	0.59	[0.41]
Leverage (%)	0.75	0.69	0.67[a]	0.69[a]	1.42	[0.50]	0.85	0.79	0.88	0.92	-0.20	[0.29]
ROA (%)	0.07[a]	0.07[c]	0.07	0.69	0.06	[0.55]	-0.01	0.05	0.08	0.10	-1.21	[0.18]
PE/VC lock-up duration (no. of days)	180.51[a]	180[a]	193.06[b]	180[a]	-2.43***	[0.17]	199.99	180.00	146.61	90.00	1.75*	[0.08]
MGT lock-up duration (no. of days)	180.75[a]	180[a]	187.08[a]	180[a]	-1.65*	[0.23]	509.46	360.00	410.13	360.00	0.52	[0.88]
Global Underwriter dummy	0.10[a]		0.12[a]		-0.49		0.34		0.45		-1.10	
High-tech dummy	0.39[c]		0.31		1.45		0.29		0.23		0.65	
Junior Market dummy	0.50		0.50		0.00		0.42		0.35		0.64	
b) Syndicate Characteristics:												
No. of funds	228		25				60		31.00			
PE/VC House's Age at IPO	21.84	18.00	26.38	22.00	-0.72	[0.34]	19.67	19.50	25.17	21.50	-1.32	[0.65]
PE/VC Fund Age at IPO	8.20[c]	18[c]	5.43	5.00	0.97	[0.34]	6.40	5.00	6.16	5.00	0.19	[0.50]
Capital Committed to PE/VC Fund ($mil)	1684.89[a]	1050[a]	633.63[a]	667.50[b]	1.36	[0.08]	858.52	484.56	772.02	459.28	0.29	[0.65]
Low proximity dummy	0.17[b]		0.43		-1.76*		0.05		0.06		-0.05	
Bank Affiliated Fund	0.17[a]		0.04		1.72**		0.08		0.10		-0.37	
Syndicate Size	2.56[a]	2[a]	1.55	1.00	4.99***	[0.00]	1.96	2.00	1.42	1.00	2.08**	[0.01]

Panel B. VC-Backed IPOs												
	Retained [5]		Exited [6]		Difference [5]-[6]		Retained [7]		Exited [8]		Difference [7]-[8]	
	Mean	Median	Mean	Median	t-stat	MW	Mean	Median	Mean	Median	t-stat	MW
	US						**UK**					
c) IPO Characteristics:												
No. of IPOs.	693		209				155		36			
Total Assets ($mil)	73.09[c]	27.58[a]	56.14	24.77[a]	0.74	[0.42]	23.65	5.47	28.81	12.10	-0.33	[0.04]
Leverage (%)	0.70[c]	0.52	0.73	0.59	-0.27	[0.09]	0.93	0.50	0.72	0.68	0.49	[0.37]
ROA (%)	-0.50[a]	-0.35	-0.29	-0.02[c]	-2.59***	[0.00]	-0.88	-0.32	-0.04	0.08	-1.13	[0.00]
PE/VC lock-up duration (no. of days)	180.03[a]	180[a]	186.43[a]	180[b]	-4.22***	[0.00]	226.14	180.00	230.20	365.00	-0.12	[0.67]
MGT lock-up duration (no. of days)	179.64[a]	180[a]	186.43[a]	180[a]	-4.79***	[0.00]	397.25	360.00	453.73	364.00	-1.82*	[0.02]
Global Underwriter dummy	0.17[a]		0.13		1.62		0.25		0.23		0.30	
High-tech dummy	0.91[a]		0.77[a]		5.45***		0.48		0.43		0.55	
Junior Market dummy	0.95[a]		0.84[b]		5.13***		0.69		0.69		0.03	
d) Syndicate Characteristics:												
No. of funds	427		125				85		35			
PE/VC House's Age at IPO	19.53	16.50	17.97	14.00	0.71	[0.11]	21.21	15.50	23.00	21.50	-0.33	[0.76]
PE/VC Fund Age at IPO	8.51	6.00	8.10	5.00	0.31	[0.41]	6.90	5.00	8.67	5.50	-0.94	[0.65]
Capital Committed to PE/VC Fund ($mil)	411.87	175.00	191.22	90.00	2.01**	[0.00]	378.97	96.56	393.69	119.23	-0.05	[0.41]
Low proximity dummy	0.29		0.14		2.60***		0.24		0.18		0.39	
Bank Affiliated Fund	0.08		0.05		1.12		0.07		0.06		0.30	
Syndicate Size	4.10[a]	4[a]	2.98[a]	2[a]	6.82***	[0.00]	2.43	2.00	1.71	1.00	2.19**	[0.02]

	Panel C. Differences between PE- and VC-Backed IPOs							
	US				UK			
	Retained [1]-[5]		Exited [2]-[6]		Retained [3]-[7]		Exited [4]-[8]	
	t-stat	MW	t-stat	MW	t-stat	MW	t-stat	MW
e) IPO Characteristics:								
Total Assets ($mil)	11.11***	[0.00]	6.67***	[0.00]	2.96***	[0.00]	1.99**	[0.10]
Leverage (%)	0.67	[0.00]	-0.70	[0.48]	-0.38	[0.01]	1.08	[0.04]
ROA (%)	10.04***	[0.00]	4.25***	[0.00]	2.30**	[0.00]	1.39	[0.55]
PE/VC lock-up duration (no. of days)	0.38	[0.76]	1.03	[0.85]	-1.29	[0.18]	-1.84*	[0.08]
MGT lock-up duration (no. of days)	1.16	[0.72]	0.13	[0.55]	1.30	[0.88]	-0.76	[0.08]
Global Underwriter dummy	-2.90***		-0.12		1.56		1.94*	
High-tech dummy	-21.21***		-8.74***		-3.19***		-1.76*	
Junior Market dummy	-19.63***		-6.78***		-4.46***		-2.81***	
f) Syndicate Characteristics:								
PE/VC House's Age at IPO	1.56	[0.03]	1.20	[0.07]	-0.55	[0.79]	0.29	[0.98]
PE/VC Fund Age at IPO	-0.36	[0.15]	-0.80	[0.92]	-0.56	[0.81]	1.94*	[0.35]
Capital Committed to PE/VC Fund ($mil)	9.43***	[0.00]	2.75***	[0.04]	2.93***	[0.00]	0.94	[0.40]
Low proximity dummy	-3.25***		1.94*		-2.96***		-1.07	
Bank Affiliated Fund	3.67***		-0.17		0.14		0.60	
Syndicate Size	-11.32***	[0.00]	-6.59***	[0.00]	-2.22**	[0.08]	-1.12	[0.37]

Table 4. Ownership Adjustments Around the IPO Date.

The sample consists of 327 UK and 1346 US backed IPOs from January 1997 thought December 2010. *Panel A* (*B*) reports ownership of financial sponsors, institutional initial shareholders and managers immediately before and after the flotation of PE (VC)-backed IPOs. Ownership is specified in percentage (%) of the firm's outstanding shares. Each panel presents data for two different geographic markets of quotation, which are divided into sub-groups depending on whether financial investors' syndicate has fully exited or retained some ownership at first quarter post lockup expiration date. Statistical significance of the difference in means and medians between US and UK backed IPOs are reported in the first four columns by [a], [b] and [c], which denote statistical significance at the 1, 5, and 10 percent levels, respectively. In column [1], [a], [b] and [c], refer to the statistical difference between retained US and UK IPOs ([1]-[3]). In column [2], [a], [b] and [c], refer to the statistical difference between exited US and UK IPOs ([2]-[4]). The same applies to Panel B. *Panel C* presents difference-in-means and medians between US and UK samples. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	PE-Backed IPOs											
	Retained [1]		Exited [2]		Diff [1]-[2]		Retained [3]		Exited [4]		Diff [3]-[4]	
	Mean	Median	Mean	Median	t-stat	MW	Mean	Median	Mean	Median	t-stat	MW
	US						**UK**					
Sponsor Ownership												
Before IPO	71.99[a]	80.87[a]	62.68[c]	73.00[b]	2.80***	[0.01]	56.09	59.33	49.40	49.50	1.12	[0.27]
After IPO	48.62[a]	52.10[a]	41.23[a]	40.30[a]	2.81***	[0.00]	27.23	23.70	13.79	5.60	3.55***	[0.00]
Diff.	*12.87****	*[0.00]*	*4.89****	*[0.00]*			*8.86****	*[0.00]*	*5.44****	*[0.00]*		
Institutional Ownership												
Before IPO	5.17	0.00	12.15[b]	0.00[a]	-3.72***	[0.01]	5.22	0.00	2.26	0.00	1.19	[0.09]
After IPO	4.02	0.00	8.89[b]	0.00[b]	-3.19***	[0.02]	2.99	0.00	1.51	0.00	0.94	[0.12]
Diff.	*1.26*	*[0.39]*	*1.02*	*[0.39]*			*1.50*	*[0.64]*	*0.36*	*[0.94]*		
Management Ownership												
Before IPO	23.53[b]	12.00[b]	29.79	17.60	-1.88*	[0.09]	17.32	9.90	20.84	15.50	-0.83	[0.30]
After IPO	16.98	7.83	20.39	10.90	-1.33	[0.12]	15.33	9.70	15.89	14.71	-0.17	[0.53]
Diff.	*3.31****	*[0.00]*	*2.38****	*[0.07]*			*0.74*	*[0.49]*	*1.14*	*[0.68]*		

Panel B. VC-Backed IPOs												
	Retained [5]		Exited [6]		Difference [5]-[6]		Retained [7]		Exited [8]		Difference [7]-[8]	
	Mean	Median	Mean	Median	t-stat	MW	Mean	Median	Mean	Median	t-stat	MW
	US						**UK**					
Sponsor Ownership												
Before IPO	53.81[a]	55.11[a]	39.10	34.25	7.15***	[0.00]	41.78	39.70	32.27	31.75	1.77*	[0.11]
After IPO	41.76[a]	42.85[a]	28.13[a]	25.32[b]	8.38***	[0.00]	27.13	23.59	17.37	16.05	2.60***	[0.00]
Diff.	*10.52***	*[0.00]*	*4.39***	*[0.00]*			*5.26***	*[0.00]*	*3.28***	*[0.00]*		
Institutional Ownership												
Before IPO	3.32[a]	0.00[a]	8.25[c]	0.00[b]	-4.87***	[0.01]	7.33	0.00	2.20	0.00	1.88*	[0.00]
After IPO	2.41[a]	0.00[a]	6.06	0.00[c]	-4.69***	[0.01]	5.10	0.00	1.68	0.00	1.59	[0.00]
Diff.	*2.00***	*[0.23]*	*1.24*	*[0.47]*			*1.39*	*[0.47]*	*0.29*	*[0.97]*		
Management Ownership												
Before IPO	30.07[c]	23.90[b]	43.14[a]	38.07[b]	-6.37***	[0.00]	26.40	19.85	31.16	28.14	-1.02	[0.34]
After IPO	23.04[b]	18.35[a]	32.33[b]	28.70[b]	-5.75***	[0.00]	19.49	14.85	23.69	19.76	-1.19	[0.23]
Diff.	*6.18***	*[0.00]*	*4.15***	*[0.00]*			*2.78***	*[0.07]*	*1.34*	*[0.24]*		

	Panel C. Differences between PE- and VC-Backed IPOs							
	US				UK			
	Retained [1]-[5]		Exited [2]-[6]		Retained [3]-[7]		Exited [4]-[8]	
	t-stat	MW	t-stat	MW	t-stat	MW	t-stat	MW
Sponsor Ownership								
Before IPO	11.05***	[0.00]	6.44***	[0.00]	3.81***	[0.00]	2.64***	[0.02]
After IPO	5.37***	[0.00]	4.47***	[0.00]	0.04	[0.76]	-0.75	[0.05]
Institutional Ownership								
Before IPO	2.63***	[0.04]	1.46	[0.06]	-1.15	[0.07]	2.19**	[0.85]
After IPO	2.78***	[0.04]	1.39	[0.11]	-1.54	[0.04]	-0.11	[0.86]
Management Ownership								
Before IPO	-3.85***	[0.00]	-3.68***	[0.00]	-3.08***	[0.00]	-1.78*	[0.09]
After IPO	-4.59***	[0.00]	-4.27***	[0.00]	-1.82*	[0.10]	-1.80*	[0.13]

Table 5. Logit Model of Financial Sponsors' Equity Retention in Various IPO Samples.

This table presents results of logit regressions, where the dependent variable is equal to one if financial sponsors' syndicate retains some ownership in the first quarter post lockup expiration date, and 0 if the syndicate fully exits. The sample consists of 327 UK and 1346 US-backed IPOs from January 1997 to December 2010. The variables are defined in Table 1. 'o' indicates that for a particular sub-sample of IPOs a specified model is not available due to a low number of observations, which is caused by the fact that Thomson One Banker does not provide fund specific variables (e.g. geographic location, bank affiliation, house and fund founding years) for all the funds in the sample. p-values are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Logit Model of Financial Sponsors' Equity Retention in Various IPO Samples										
	All Backed IPOs		PE-Backed IPOs		VC-Backed IPO		US IPOs		UK IPOs	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
INTERCEPT	-0.87	-5.96**	-2.43*	o	1.09	-3.63	-3.19**	-5.80**	14.13	o
	[0.309]	[0.001]	[0.099]	o	[0.457]	[0.152]	[0.008]	[0.012]	[0.96]	o
US DUMMY	-1.34**	0.65	-0.41	o	-2.54**	-1.75				
	[0.002]	[0.346]	[0.501]	o	[0.005]	[0.196]				
PE DUMMY	-0.19	0.03					-0.15	0.88	-1.12	o
	[0.503]	[0.952]					[0.641]	[0.212]	[0.325]	o
PE/VC LOCKUP DUR	-0.01**	0.00	0.00	o	-0.01**	-0.01	0.00	0.00	-0.01**	o
	[0.013]	[0.732]	[0.237]	o	[0.008]	[0.403]	[0.252]	[0.596]	[0.025]	o
PE/VC $OWN_{pre\text{-}ipo}$	0.74	2.58**	0.17	o	2.01**	5.33**	0.76	3.29**	3.14	o
	[0.138]	[0.011]	[0.814]	o	[0.011]	[0.001]	[0.159]	[0.010]	[0.114]	o
$INST\_OWN_{post\text{-}ipo}$	-1.62**	-2.73	-0.26	o	-2.46**	-3.82**	-2.02**	-3.24*	15.43	o
	[0.041]	[0.111]	[0.877]	o	[0.015]	[0.064]	[0.019]	[0.078]	[0.129]	o
$MGT\_OWN_{post\text{-}ipo}$	0.17	-0.43	0.48	o	-0.28	0.16	0.25	-0.50	2.70	o
	[0.758]	[0.642]	[0.587]	o	[0.725]	[0.907]	[0.675]	[0.657]	[0.447]	o
UND. REP	0.33	0.55	0.41	o	0.29	0.15	0.41	1.27	0.45	o
	[0.298]	[0.349]	[0.456]	o	[0.490]	[0.849]	[0.254]	[0.148]	[0.701]	o
$ROA_{pre\text{-}ipo}$	-0.43*	-0.42	-1.55	o	-0.40	-0.43	-0.47**	-0.53	-0.06	o
	[0.054]	[0.224]	[0.206]	o	[0.103]	[0.185]	[0.048]	[0.196]	[0.931]	o
$LEV_{pre\text{-}ipo}$	-0.05	-0.18	0.80*	o	-0.18	-0.42**	-0.04	-0.34**	0.01	o
	[0.706]	[0.221]	[0.099]	o	[0.137]	[0.013]	[0.814]	[0.041]	[0.984]	o
SIZE	0.27**	0.49**	0.25	o	0.30**	0.49**	0.42***	0.75***	-0.38	o
	[0.007]	[0.003]	[0.182]	o	[0.033]	[0.032]	[0.001]	[0.002]	[0.328]	o

FDR	-0.26	-0.54**	-0.04	o	-0.39*	-0.51*	-0.39*	-0.61*	11.25*	o
	[0.175]	[0.040]	[0.928]	o	[0.081]	[0.079]	[0.045]	[0.034]	[0.033]	o
HIGHTECH DUMMY	0.33	0.94**	-0.15	o	0.90**	2.34***	0.39	1.33**	0.44	o
	[0.188]	[0.031]	[0.679]	o	[0.012]	[0.000]	[0.152]	[0.014]	[0.683]	o
SYND. SIZE	0.85**	-0.42	2.10***	o	-0.02	-1.39**	0.84***	-0.85	2.77*	o
	[0.002]	[0.347]	[0.000]	o	[0.963]	[0.034]	[0.003]	[0.109]	[0.060]	o
LOW PROXIMITY DUMMY		-0.74		o		-1.80*		-0.28		o
		[0.253]		o		[0.061]		[0.722]		o
BANK AFF. DUMMY		0.22		o		-0.21		0.29		o
		[0.719]		o		[0.796]		[0.712]		o
PE/VC HOUSE AGE		0.24		o		0.31		0.30		o
		[0.306]		o		[0.305]		[0.293]		o
PE/VC FUND AGE		0.26		o		0.24		0.26		o
		[0.365]		o		[0.477]		[0.388]		o
YEAR DUMMIES	YES	YES	YES	o	YES	YES	YES	YES	YES	o
No. of Obs.	939	497	290	o	647	325	820	405	86	o
Pseudo R^2	19.69%	30.31%	18.40%	o	27.47%	40.10%	21.66%	37.01%	38.04%	o

Table 6. Voluntary and Compulsory Ownership Evolutions post-IPO.

The sample consists of 327 UK and 1346 US-backed IPOs from January 1997 thought December 2010. The table reports difference-in-means of the average financial sponsors' holdings between PE and VC samples. Q' refers to the number of quarters after the initial public offering. t-statistics for difference-in-means are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Differences-in-means between PE and VC Samples											
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**
Voluntary Ownership:												
US	3.26***	3.28***	3.33***	3.16***	3.74***	3.75***	2.79***	3.29***	3.42***	2.88***	2.87***	2.93***
UK	0.09	1.10	0.99	0.27	1.86*	1.74*	1.69*	1.53	1.49	1.40	1.62	1.32
Compulsory Ownership:												
US	4.93***	5.05***	1.95***	1.16								
UK	-1.06	-1.07	-1.16	-1.55	-1.20	-0.39						

Table 7.Voluntary Ownership (%) in UK IPOs Sub-Samples.[43]

The sample consists of 327 UK IPOs from January 1997 thought December 2010. This table presents the average percentage of the firm's outstanding shares held by financial sponsors as a group in PE- and VC-backed IPOs. Summary statistics are presented for two types of UK companies: those in which PE/VC syndicates are subject to lockup agreement ('Lock-up Sample' consists of 229 firms) and those in which PE/VC investors are free to sell shares immediately post-flotation ('No Lock-up Sample' consists of 98 firms). For IPOs with PE/VC lockups, only ownership holdings post lockup expiration are regarded as voluntary. For IPOs with no PE/VC lockup, the ownership during all the quarters is considered to be voluntary. 'Q' refers to the number of quarters after the initial public offering. t-statistics for difference-in-means are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Average Voluntary Holdings (%) by Financial Sponsors in UK Backed IPOs											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
PE-Backed IPOs:												
No Lock-up Sample	8.45	7.58	7.09	7.29	6.94	6.24	6.09	6.28	5.39	4.80	4.71	4.56
Lock-up Sample	39.05	29.00	27.41	25.22	22.27	21.80	20.60	19.36	17.38	15.16	13.68	12.47
Diff.	*-5.70****	*-5.85****	*-5.63****	*-5.02****	*-4.42****	*-4.53****	*-4.25****	*-3.91****	*-3.73****	*-3.38****	*-2.99****	*-2.74****
VC-Backed IPOs:												
No Lock-up Sample	8.01	8.66	8.53	8.23	8.22	6.67	6.03	5.43	4.99	4.80	4.45	3.86
Lock-up Sample	11.44	20.47	20.94	19.36	17.82	17.39	17.26	15.50	13.16	11.71	10.36	9.18
Diff.	*-1.00*	*-1.86**	*-2.21***	*-2.04***	*-2.46****	*-2.79****	*-2.41****	*-2.36****	*-2.06***	*-1.76**	*-1.52*	*-1.46*
Differences between VC and PE Samples: (t-stat)												
No Lock-up Sample	*0.19*	*-0.47*	*-0.63*	*-0.43*	*-0.59*	*-0.22*	*0.03*	*0.48*	*0.23*	*-0.01*	*0.15*	*0.44*
Lock-up Sample	*3.21****	*3.25****	*3.07****	*2.92****	*3.09****	*3.08****	*2.00***	*2.50****	*2.92****	*2.43****	*2.36****	*2.47****

[43] Please note that by 'No lockup' I only refer to lockup restrictions applicable to PE/VC investors, and not all insiders.

Table 8. OLS Multivariate Analysis of Compulsory and Voluntary Ownership by Financial Sponsors' Syndicates Post-Flotation.

Table 8 presents results of OLS analysis of compulsory (Panel A) and voluntary (Panel B) ownership by PE and VC syndicates post-flotation. The sample consists of 327 UK and 1346 US-backed IPOs from January 1997 thought December 2010. In *Panel A*, the dependent variable is the percentage of outstanding shares held by PE or VC investors as a group at first quarter (Model [1] and [3]) and second quarter post-flotation (Model [2] and [4]) as dictated by the lockup agreement. In *Panel B*, the dependent variable is the percentage of outstanding shares held voluntarily by PE or VC investors as a group in quarter 4 (Model [5] and [7]) and 12 (Model [6] and [8]) post-flotation. All other variables are defined in Table 1. Fama-French industry classification is used. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Financial Sponsors' Compulsory Ownership				
	PE-Backed IPOs		**VC-Backed IPOs**	
	Q1	Q2	Q1	Q2
	[1]	[2]	[3]	[4]
INTERCEPT	0.12	0.24	0.03	-0.06
	[0.64]	[1.09]	[0.24]	[-0.53]
US DUMMY	0.14***	0.09*	-0.01	-0.05
	[3.06]	[1.75]	[-0.36]	[-1.43]
PROP_INIT_PEVC_OWN_SOLD	-0.55***	-0.50***	-0.15*	-0.11
	[-5.81]	[-4.62]	[-1.95]	[-1.41]
SYND. SIZE	-0.01	0.03	0.07***	0.09***
	[-0.25]	[0.58]	[3.07]	[4.19]
LOW PROXIMITY DUMMY	-0.05	0.09	0.06	0.07*
	[-0.65]	[1.05]	[1.62]	[1.83]
BANK_AFF	-0.03	0.00	-0.04	-0.04
	[-0.56]	[-0.05]	[-1.24]	[-1.16]
PE/VC HOUSE AGE	-0.02	-0.03	0.01	0.01
	[-0.73]	[-0.83]	[0.45]	[0.67]
UND. REP	0.04	0.00	-0.06**	-0.04
	[0.85]	[-0.07]	[-2.18]	[-1.47]
$INST\_OWN_{t-1}$	-0.43**	-0.61**	-0.50***	-0.46**
	[-2.12]	[-2.11]	[-4.54]	[-2.15]
$SIZE_{t-1}$	0.06***	0.07***	0.00	-0.01
	[3.28]	[3.56]	[-0.45]	[-0.76]
M/B_{t-1}	-0.01**	0.00	0.00	-0.01*
	[-2.17]	[-0.66]	[-1.18]	[-1.78]
ROA_{t-1}	0.02	0.05	-0.01*	-0.01**
	[0.27]	[0.50]	[-1.82]	[-2.20]
$CARs_{t-1}$	-0.11	0.08	-0.04	-0.01
	[-0.33]	[0.18]	[-0.37]	[-0.09]
INDUSTRY DUMMIES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES
No. Of Obs.	143	142	310	310
R^2	0.4954	0.4392	0.35823	0.3353

Panel B. Financial Sponsors' Voluntary Ownership				
	PE-Backed IPOs		**VC-Backed IPOs**	
	Q4	Q12	Q4	Q12
	[5]	[6]	[7]	[8]
INTERCEPT	0.75***	0.70**	0.02	0.11*
	[2.39]	[2.22]	[0.20]	[1.92]
US DUMMY	-0.02	-0.01	-0.04	-0.01
	[-0.36]	[-0.21]	[-1.16]	[-0.65]
PROP_INIT_PEVC_OWN_SOLD	-0.66***	-0.37***	-0.14**	-0.04
	[-6.43]	[-3.58]	[-2.08]	[-1.17]
SYND. SIZE	0.02	0.01	0.07***	0.02*
	[0.49]	[0.10]	[3.45]	[1.93]
LOW PROXIMITY DUMMY	-0.03	-0.02	0.08**	-0.05**
	[-0.36]	[-0.24]	[2.27]	[-2.09]
BANK_AFF	-0.11**	-0.02	-0.03	-0.01
	[-2.02]	[-0.41]	[-1.17]	[-0.91]
PE/VC HOUSE AGE	-0.04	-0.05	0.01	0.00
	[-1.28]	[-1.24]	[1.06]	[-0.12]
UND. REP	0.02	0.01	-0.02	-0.02
	[0.42]	[0.14]	[-0.88]	[-1.39]
$INST\_OWN_{t-1}$	-0.51	-0.43	-0.25	-0.22**
	[-1.37]	[-0.94]	[-1.61]	[-2.24]
$SIZE_{t-1}$	0.01	0.01	-0.02**	-0.01***
	[0.45]	[0.34]	[-2.06]	[-3.70]
M/B_{t-1}	0.00	-0.01*	0.00	0.00
	[0.20]	[-1.79]	[1.32]	[1.20]
ROA_{t-1}	-0.21	-0.03	0.01	0.00
	[-1.22]	[-0.26]	[0.21]	[0.28]
$CARs_{t-1}$	-1.70**	-1.28*	-0.12	0.03
	[-2.20]	[-1.64]	[-1.37]	[0.39]
INDUSTRY DUMMIES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES
No. Of Obs.	141	119	320	249
R^2	0.4645	0.4353	0.3032	0.2146

Table 9. Financial Sponsors' Ownership Drivers in US and UK Stock Markets.

This table presents results of OLS analysis of compulsory and voluntary ownership by financial sponsors' syndicates in the post-flotation period. Specified regressions use pooled data from 327 UK and 1346 US-backed IPOs for quarter 1 and 2 (Models [1] to [3]), and quarter 4, 8, 12 after the firms' IPOs (Models [4] to [6]). In Models [1] to [3], the dependent variable is the percentage of outstanding shares held by financial sponsors as a group as dictated by the lockup agreement. In Models [4] to [6], the dependent variable is the percentage of outstanding shares held voluntarily by financial sponsors as a group post-flotation. All other variables are defined in Table 1. Fama-French industry classification is used. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

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	Financial Sponsors' Compulsory Ownership in Quarter 1 & 2 post-IPO			**Financial Sponsors' Voluntary Ownership in Quarter 4, 8 and 12 post-IPO**		
	ALL IPOs	**US IPOs**	**UK IPOs**	**ALL IPOs**	**US IPOs**	**UK IPOs**
	[1]	[2]	[3]	[4]	[5]	[6]
INTERCEPT	0.05	-0.02	0.17	0.30***	0.28***	0.25*
	[0.85]	[-0.23]	[1.44]	[3.99]	[3.56]	[1.64]
PE DUMMY	0.24***	0.29***	0.04	0.15***	0.23***	0.05**
	[14.65]	[16.17]	[1.30]	[10.15]	[13.11]	[2.31]
US DUMMY	0.01			-0.01		
	[0.03]			[-0.59]		
PROP_INIT_PEVC_OWN_SOLD	-0.28***	-0.26***	-0.13**	-0.31***	-0.32***	-0.09***
	[-6.74]	[-4.68]	[-2.06]	[-9.58]	[-6.89]	[-2.67]
SYND. SIZE	0.07***	0.08***	0.10***	0.04***	0.03**	0.07***
	[5.09]	[5.06]	[3.11]	[3.17]	[2.24]	[3.46]
LOW PROXIMITY DUMMY	0.11***	0.12***	-0.16***	0.06***	0.12***	-0.18***
	[5.30]	[6.02]	[-2.42]	[3.49]	[6.16]	[-4.36]
BANK AFF. DUMMY	-0.02	-0.03	0.02	-0.01	-0.01	-0.05**
	[-0.96]	[-1.53]	[0.41]	[-0.94]	[-0.77]	[-2.28]
PE/VC HOUSE AGE	0.01	0.01	-0.01	-0.01	-0.01	-0.03*
	[1.16]	[1.03]	[-0.38]	[-1.18]	[-0.22]	[-1.84]
UND. REP	-0.02	0.01	-0.01	-0.01	0.04**	-0.04*
	[-1.02]	[0.32]	[-0.34]	[-0.33]	[2.33]	[-1.96]
$INST\_OWN_{t-1}$	-0.41***	-0.48***	0.06	-0.32***	-0.56***	-0.21**
	[-4.84]	[-5.33]	[0.35]	[-3.75]	[-3.90]	[-2.28]
$SIZE_{t-1}$	0.02***	0.04***	0.01	-0.01***	-0.01	-0.02**
	[4.02]	[5.43]	[0.38]	[-3.53]	[-1.49]	[-2.32]
M/B_{t-1}	-0.01***	-0.01*	-0.01***	0.01	0.01	0.01
	[-4.28]	[-1.91]	[-3.61]	[0.11]	[0.77]	[1.15]
ROA_{t-1}	-0.02***	-0.02***	-0.02***	0.01	0.01	-0.09***
	[-4.69]	[-2.41]	[-3.68]	[0.60]	[0.41]	[-3.12]
$CARs_{t-1}$	0.01	-0.02	0.20	-0.05	-0.05	-0.12
	[0.18]	[-0.20]	[0.40]	[-0.76]	[-0.68]	[-0.84]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
No. Of Obs.	900	766	134	1276	1031	245
R^2	0.3041	0.3719	0.3316	0.1790	0.2252	0.3075

Table 10. Test of the Signaling Hypothesis.

Table 10 presents results of a multivariate analysis of three year market-adjusted buy and hold abnormal returns. The sample consists of 327 UK and 1346 US-backed IPOs. The dependent variable is three year market-adjusted buy-and-hold abnormal returns. All other variables are defined in Table 2. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Market-Adjusted 3-year BHARs					
	ALL		**PE**		**VC**	
	[1]	[2]	[3]	[4]	[5]	[6]
CONSTANT	-1.06***	-1.44***	-0.99***	-2.07***	-1.01***	-1.44***
	[-8.25]	[-10.31]	[-4.30]	[-4.42]	[-6.11]	[-10.86]
US DUMMY	-0.27***	-0.17***	-0.37***	-0.33***	-0.17***	-0.08*
	[-6.05]	[-4.45]	[-4.48]	[-3.96]	[-3.26]	[-1.90]
PE DUMMY	0.15***	0.11***				
	[3.52]	[2.99]				
PE/VC_OWN_{t-1}	-0.15*	-0.44***	-0.54***	-0.54	0.04	-0.20*
	[-1.87]	[-4.30]	[-3.49]	[-1.22]	[0.38]	[-1.70]
$(PE/VC\_OWN_{t-1})^2$		0.12**		0.11		0.03
		[2.12]		[0.16]		[0.65]
FDR	-0.04	-0.05**	-0.03	0.01	-0.03	-0.03
	[-1.38]	[-2.02]	[-0.26]	[0.07]	[-1.14]	[-1.59]
$SIZE_{t-1}$	0.12***	0.08***	0.17***	0.15***	0.08***	0.05***
	[9.91]	[8.60]	[6.92]	[5.95]	[6.45]	[5.83]
M/B_{t-1}	-0.01	-0.01	-0.01	-0.01	-0.01	0.01
	[-0.62]	[-0.85]	[-1.07]	[-0.92]	[-0.63]	[0.05]
LEV_{t-1}	0.01	-0.01	-0.15	-0.12	0.00	0.00
	[0.01]	[-0.82]	[-1.28]	[-1.04]	[-0.24]	[-0.91]
LOCK-UP DUR.	0.00	-0.01***	0.00	-0.01	0.00	-0.01***
	[-1.11]	[-2.95]	[-0.60]	[-0.64]	[-1.01]	[-2.41]
UND. REP	0.00	-0.04	-0.09	-0.13	0.05	-0.01
	[-0.05]	[-0.98]	[-1.00]	[-1.53]	[1.06]	[-0.13]
MGT_OWN_{t-1}	0.25*	-0.07	0.45	0.34	0.19	-0.07
	[1.81]	[-0.62]	[1.49]	[1.17]	[1.31]	[-0.69]
$INST\_OWN_{t-1}$	0.25	0.03	-0.11	0.13	0.52	0.02
	[0.91]	[0.15]	[-0.23]	[0.29]	[1.55]	[0.08]
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES
No. of Obs	799	781	288	280	511	501
R^2	0.13	0.24	0.18	0.24	0.07	0.27

Table 11. Fama and French 4 Factor Model.

The sample consists of backed and non-backed IPOs, which were quoted on US and UK stock markets between January 1997 and December 2010. The calendar-time portfolio approach proposed by Mitchell and Stafford (2000) is used to calculate the average alpha. Each month (starting from January 1997), I form a portfolio of IPO companies and rebalance this portfolio every month in order to add companies which had a flotation, and drop IPOs that reach the end of a holding period. I then compute the portfolio monthly excess returns (equally-weighted) and regress it against the four factors (i.e. SML, HML, MOM, and $R_{m,t}–R_{f,t}$), which I obtain from Kenneth French's website. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

36 months Holding Period									
	Non-Backed IPOs	**PE-Backed IPOs**	**VC-Backed IPOs**	**Exited Backed IPOs**		**Retained Backed IPOs**		**Retained IPOs (at Q12 post-IPO)**	
				PE	**VC**	**PE**	**VC**	**PE**	**VC**
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Alpha	-0.0267***	-0.0109**	-0.0267***	-0.0136***	-0.0260***	-0.0110**	-0.0285***	-0.0128**	-0.0302***
	[-5.00]	[-2.20]	[-3.70]	[-2.45]	[-3.74]	[-2.14]	[-3.78]	[-2.22]	[-3.76]
SMB	0.0047***	0.0038***	0.0037*	0.0046***	0.0042**	0.0038***	0.0040*	0.0082***	0.0124***
	[2.82]	[2.50]	[1.77]	[2.80]	[2.03]	[2.36]	[1.76]	[3.55]	[3.96]
HML	0.0033*	0.0040***	0.0022	0.0052***	0.0038*	0.0040**	0.0040*	0.0022	-0.0018
	[1.86]	[2.42]	[1.01]	[2.89]	[1.70]	[2.25]	[1.67]	[0.97]	[-0.60]
R_m-R_f	0.0022**	0.0021**	0.0043***	0.0013	0.0029**	0.0024**	0.0046***	0.0028***	0.0053***
	[2.07]	[1.98]	[2.85]	[1.14]	[2.04]	[2.13]	[2.86]	[2.49]	[3.52]
MOM	0.0017	0.0003	0.0016	0.0003	0.0019	0.0004	0.0018	0.0012	0.0020
	[1.62]	[0.33]	[1.21]	[0.27]	[1.46]	[0.37]	[1.32]	[0.94]	[1.16]
No. of Obs.	219	219	194	194	194	219	194	219	194
Adj R^2	0.0394	0.0405	0.0405	0.0445	0.0292	0.0403	0.0385	0.0606	0.1078

Table 12. Endogeneity Tests

This table reports the results of endogeneity tests. I use instrumental variables approach. The sample consists of 327 UK and 1346 US-backed IPOs from January 1997 thought December 2010. The dependent variable is equal to PE/VC syndicate ownership in Model [1] and [3], whereas the dependent variable is one, two, and three year market-adjusted buy-and-hold abnormal returns. In Model [2] and [4], the equation is estimated with syndicate size as an instrument for syndicate ownership retention. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	VC-Backed IPOs		**PE-Backed IPOs**	
	First Stage	2SLS	First Stage	2SLS
	[1]	[2]	[3]	[4]
CONSTANT	0.04	-0.55	0.12	-0.18
	[0.29]	[-1.55]	[0.67]	[-0.34]
PE/VC POST-IPO OWN IV:				
SYNDICATE SIZE	0.03***	0.38	0.02***	-1.94*
	[5.26]	[0.81]	[2.90]	[-1.87]
FDR	0.00	-0.12***	-0.01	-0.14*
	[-0.31]	[-3.37]	[-0.33]	[-1.95]
$SIZE_{t-1}$	-0.02***	0.17***	-0.01	0.15***
	[-3.21]	[9.48]	[-0.83]	[8.46]
M/B_{t-1}	0.01	0.01	-0.01	-0.01**
	[0.50]	[0.56]	[-0.98]	[-2.14]
LEV_{t-1}	-0.01	0.00	0.08***	0.08
	[-0.10]	[0.31]	[3.46]	[0.75]
LOCK-UP DUR.	-0.01	-0.01	-0.01	-0.01**
	[-0.72]	[-0.35]	[-0.21]	[-2.21]
UND. REP	-0.02	-0.02	0.01	-0.16***
	[-0.82]	[-0.27]	[0.00]	[-2.40]
MGT_OWN_{t-1}	0.01	0.01	-0.08*	0.25
	[0.10]	[0.11]	[-1.85]	[1.55]
$INST\_OWN_{t-1}$	-0.32***	0.31	-0.15*	-0.36

	[-2.45]	[0.83]	[-1.70]	[-1.16]
US DUMMY	0.01	-0.27***	0.10***	-0.20*
	[0.12]	[-3.37]	[4.53]	[-1.67]
YEAR DUMMIES	YES	YES	YES	YES
INDUSTRY DUMMIES	YES	YES	YES	YES
No. of Obs	1682	1682	852	852
Adjusted R^2	6.33%	8.16%	7.37%	.

Figures for Empirical Study 1

Figure 1.1: Annual distribution of the PE and VC-backed IPOs in UK and US.

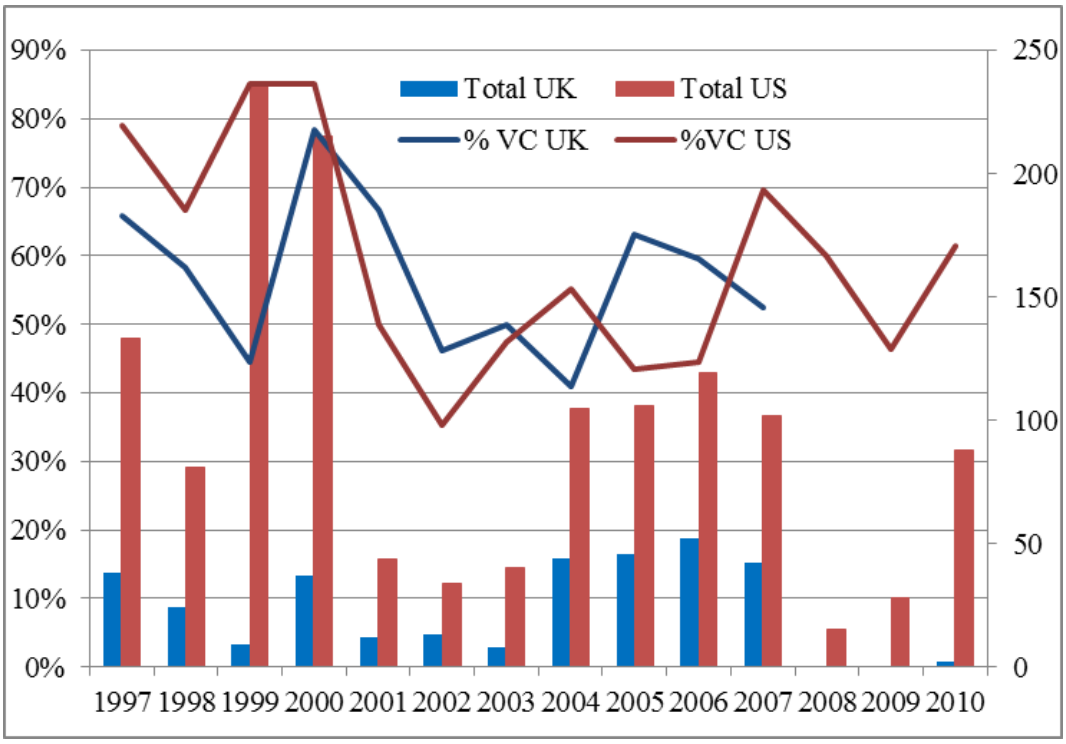


Figure 1.2: Industry distribution of the PE and VC-backed IPOs in UK and US.

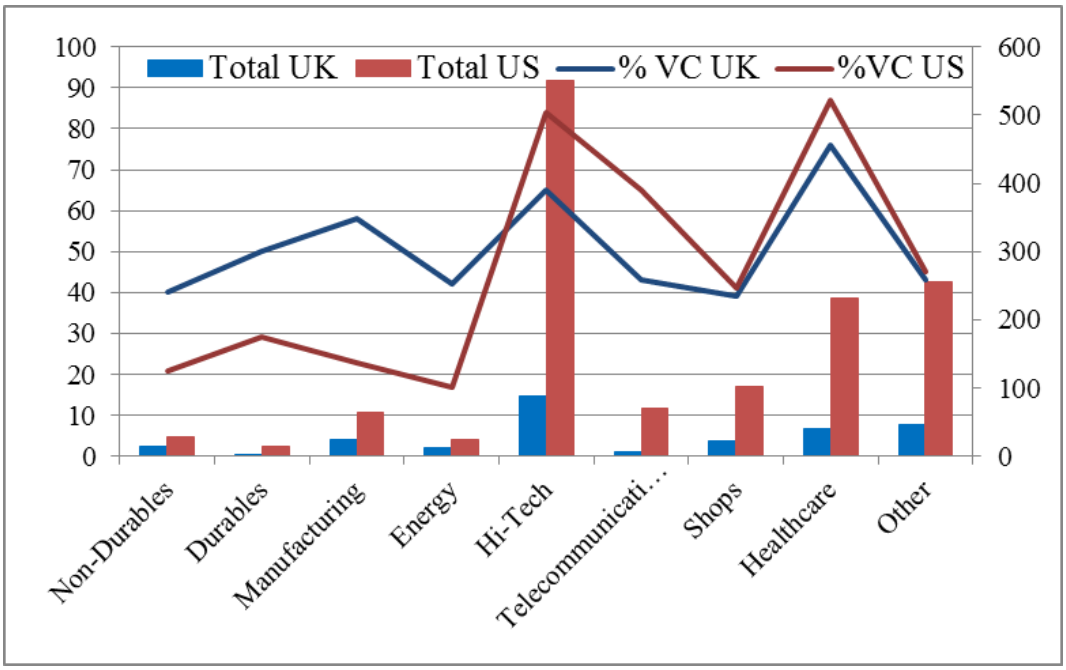


Figure 1.3: Average PE Voluntary Ownership (%) in UK and US IPOs.

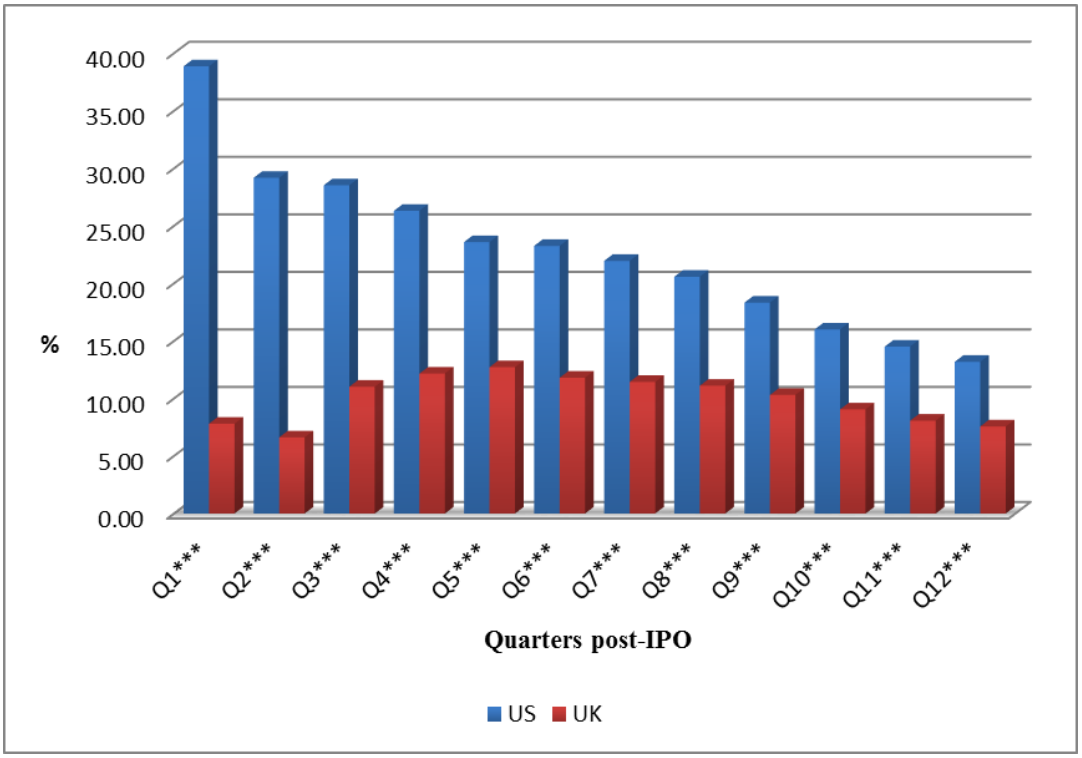


Figure 1.4: Average VC Voluntary Ownership (%) in UK and US IPOs.

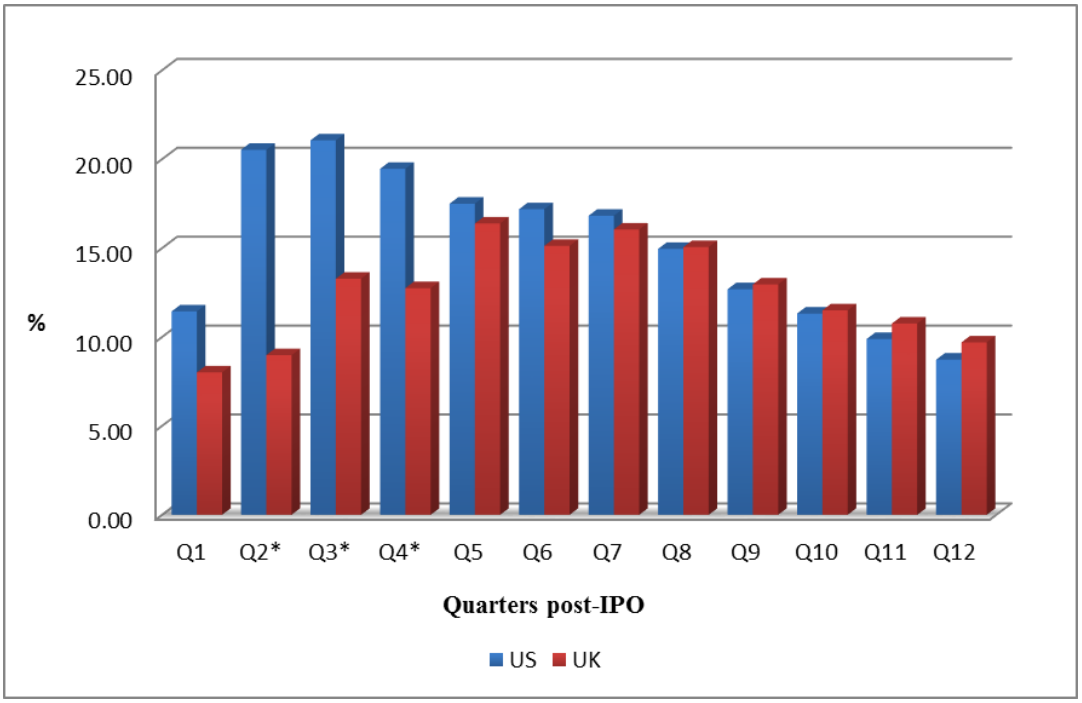


Figure 1.5: Average PE Compulsory Ownership (%) in UK and US IPOs.

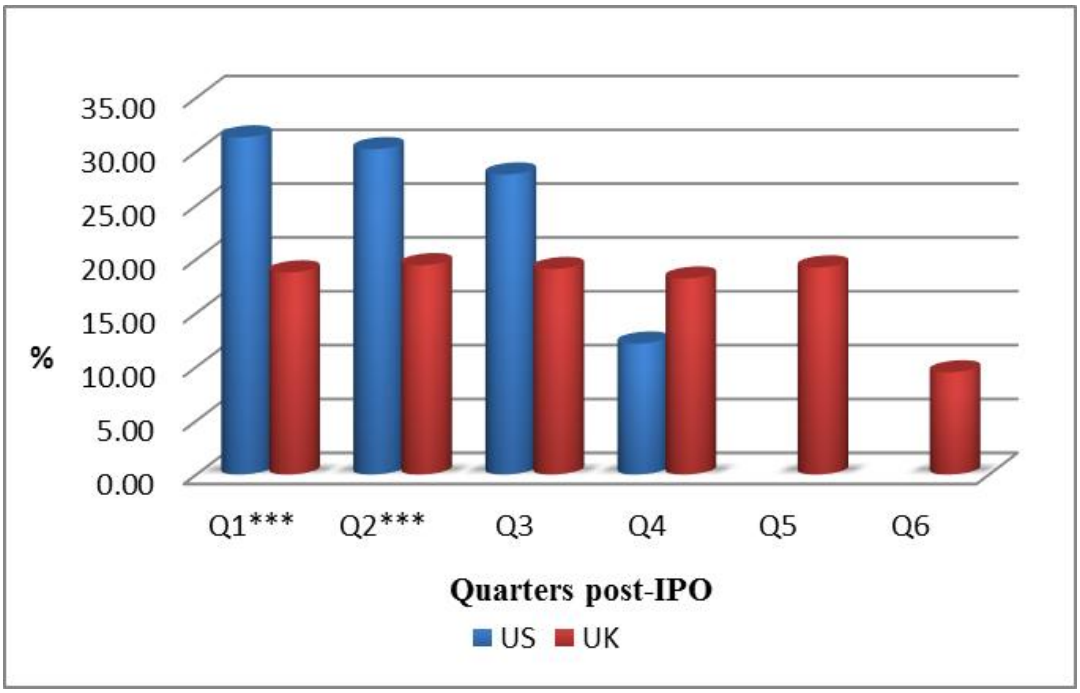
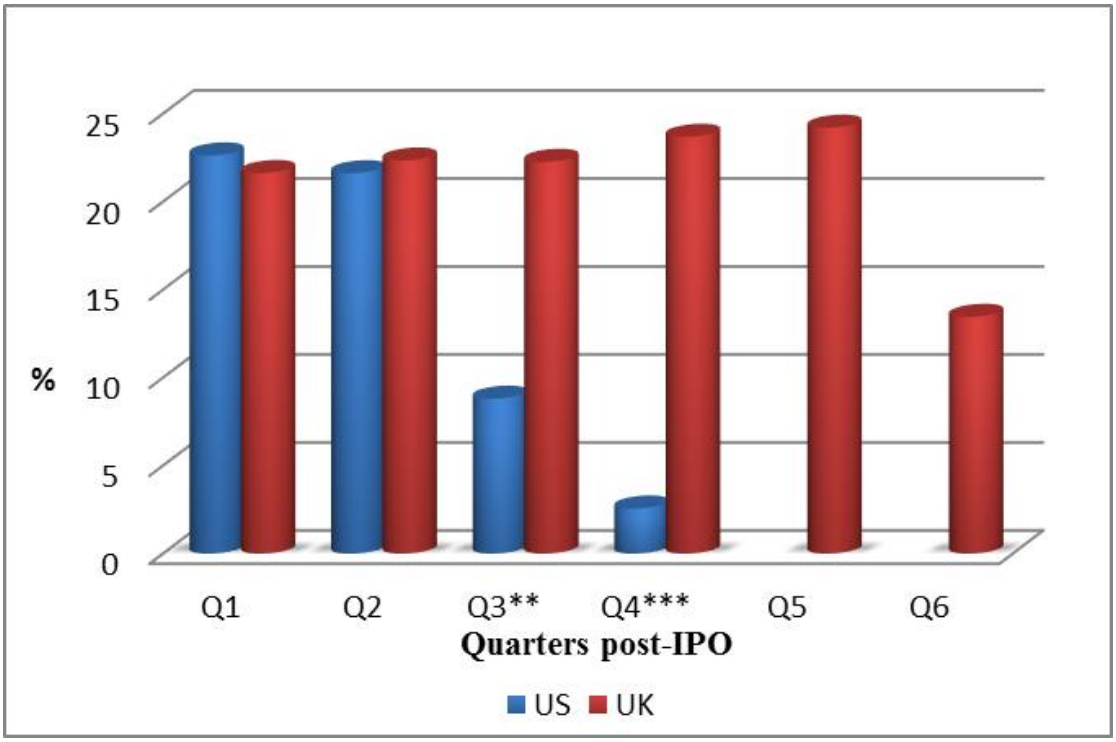


Figure 1.6: Average VC Compulsory Ownership (%) in UK and US IPOs.



Appendices for Empirical Study 1

Appendix 1. **Average Financial Sponsors' Ownership in UK and US IPOs.**

Panel A. Average Financial Sponsors' Group Voluntary Ownership (%) in UK and US IPOs.												
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
PE Syndicate Ownership												
US	38.87	29.18	28.53	26.31	23.59	23.26	21.96	20.58	18.33	16.00	14.51	13.19
UK	7.81	6.62	11.02	12.17	12.72	11.81	11.44	11.11	10.31	9.05	8.07	7.57
t-stat: US-UK	*6.13****	*6.26****	*6.39****	*5.51****	*4.94****	*5.27****	*4.89****	*4.49****	*3.96****	*3.59****	*3.40****	*3.08****
VC Syndicate Ownership												
US	11.44	20.53	21.06	19.46	17.50	17.19	16.82	14.96	12.69	11.32	9.89	8.73
UK	8.01	8.98	13.28	12.75	16.39	15.13	16.05	15.06	12.96	11.50	10.76	9.70
t-stat: US-UK	*1.00*	*1.90**	*1.83**	*1.66**	*0.47*	*0.91*	*0.28*	*-0.04*	*-0.11*	*-0.07*	*-0.38*	*-0.45*

Panel B. Average Financial Sponsors' Group Compulsory Ownership (%) in UK and US IPOs.						
	Q1	Q2	Q3	Q4	Q5	Q6
PE Syndicate Ownership						
US	31.30	30.20	27.85	12.15		
UK	18.76	19.43	19.07	18.19	19.22	9.48
t-stat: US-UK	*4.32****	*3.80****	*1.38*	*-0.90*		
VC Syndicate Ownership						
US	22.62	21.61	8.80	2.56		
UK	21.62	22.33	22.26	23.68	24.20	13.45
t-stat: US-UK	*0.36*	*-0.26*	*-1.98***	*-2.50****		

Appendix 2. Differences-in-means between US and UK Sample

Differences-in-means between US and UK Sample												
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**
Voluntary Ownership:												
PE	-6.13***	-6.26***	-6.39***	-5.51***	-4.94***	-5.27***	-4.89***	-4.49***	-3.96***	-3.59***	-3.40***	-3.08***
VC	-1.00	-1.90*	-1.83*	-1.66*	-0.47	-0.91	-0.28	0.04	0.11	0.07	0.38	0.45
Compulsory Ownership:												
PE	4.32***	3.80***	1.38	-0.90								
VC	0.36	-0.26	-1.98**	-2.50***								

Appendix 3. Alphas for Various Holding Periods

	Panel A. 12 months Holding Period								
	Non-Backed IPOs	**PE-Backed IPOs**	**VC-Backed IPOs**	**Exited Backed IPOs**		**Retained Backed IPOs**		**Retained IPOs (at Q12 post-IPO)**	
				PE	**VC**	**PE**	**VC**	**PE**	**VC**
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
alpha	-0.0253***	-0.0130**	-0.0320***	-0.0141	-0.0396***	-0.0101*	-0.0282***	-0.0130	-0.0253***
	[-4.60]	[-1.97]	[-3.68]	[-1.05]	[-2.83]	[-1.68]	[-3.13]	[-1.64]	[-2.84]
SMB	0.0067***	0.0032	0.0054**	0.0023	0.0076*	0.0041**	0.0070***	0.0048	0.0104***
	[3.77]	[1.64]	[2.18]	[0.61]	[1.87]	[2.30]	[2.77]	[1.64]	[3.23]
HML	0.0009	0.0033	0.0001	-0.0033	-0.0020	0.0024	0.0003	0.0031	-0.0040
	[0.51]	[1.50]	[0.02]	[-0.80]	[-0.49]	[1.26]	[0.10]	[1.08]	[-1.27]
R_m-R_f	0.0014	0.0031**	0.0039**	-0.0013	0.0027	0.0032***	0.0024	0.0041***	0.0055***
	[1.23]	[2.27]	[2.15]	[-0.46]	[0.97]	[2.46]	[1.31]	[2.53]	[3.23]
MOM	0.0017*	0.0021*	0.0024	0.0044*	0.0084***	0.0010	0.0013	0.0003	0.0009
	[1.71]	[1.67]	[1.58]	[1.92]	[3.27]	[0.92]	[0.85]	[0.19]	[0.54]
No. of Obs.	219	200	179	176	178	199	179	190	173
Adj R^2	0.058	0.0282	0.0388	0.0076	0.0521	0.0395	0.0385	0.0342	0.0969

	Panel B. 24 months Holding Period								
	Non-Backed IPOs	**PE-Backed IPOs**	**VC-Backed IPOs**	**Exited Backed IPOs**		**Retained Backed IPOs**		**Retained IPOs (at Q12 post-IPO)**	
				PE	**VC**	**PE**	**VC**	**PE**	**VC**
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
alpha	-0.0280***	-0.0103*	-0.0305***	-0.0156**	-0.0329***	-0.0101*	-0.0303***	-0.0121**	-0.0338***
	[-4.98]	[-1.93]	[-3.93]	[-2.16]	[-4.00]	[-1.82]	[-3.93]	[-1.99]	[-4.06]
SMB	0.0047***	0.0033**	0.0046**	0.0090***	0.0008	0.0038**	0.0063***	0.0088***	0.0112***
	[2.75]	[2.01]	[2.03]	[3.38]	[0.30]	[2.24]	[2.75]	[3.70]	[3.59]
HML	0.0021	0.0033*	0.0020	0.0008	0.0018	0.0040**	0.0026	0.0034	-0.0030
	[1.18]	[1.88]	[0.80]	[0.29]	[0.69]	[2.21]	[1.07]	[1.44]	[-0.98]
R_m-R_f	0.0021*	0.0020*	0.0032*	0.0018	0.0042***	0.0027**	0.0033**	0.0031***	0.0056***
	[1.81]	[1.68]	[1.99]	[1.32]	[2.34]	[2.20]	[2.10]	[2.60]	[3.60]
MOM	0.0015	0.0003	0.0011	0.0009	0.0030*	0.0004	0.0022	0.0011	0.0026
	[1.45]	[0.32]	[0.76]	[0.59]	[1.87]	[0.35]	[1.58]	[0.83]	[1.44]
No. of Obs.	219	216	191	191	190	216	191	207	185
Adj R^2	0.0309	0.0206	0.0227	0.0464	0.0158	0.0384	0.0465	0.0771	0.1129

Chapter 3: Are Corporate Policies Affected by the Continued Presence of PE and VC Investors Post-IPO?

Abstract

This paper shows that financial sponsors actively shape IPO firms' corporate policies in the post-flotation period, but their impact depends on their types and their characteristics. I find that PE investors, particularly when they are bank-affiliated, prefer their portfolio companies to have significantly larger boards, initiate cash dividends and reduce capital expenditure when they are distant from the IPO location. In contrast, VC sponsors focus on the proportion of independent directors, and minimize capital and acquisition expenditures in all retained firms. I also find that backed IPOs do not buy back their shares. Overall, these two financial sponsors do not appear to necessarily lead their IPOs into value creating decisions.

Keywords: Private Equity, Venture Capital, Ownership, Firm Value, Board of Directors, Spending, Payout, Dividend, Share Repurchase, IPOs.

3.1 Introduction

Financial sponsors (private equity and venture capital investors) exert significant influence on firms' operations, governance, management, and various corporate policies while companies are under their private ownership (Jensen 1986, 1989; Baker and Wruck, 1989; Baker and Gompers, 2003; Hochberg, 2012; Acharya *et al*, 2009). Upon completion of restructuring and value-adding activities, private equity (PE) and venture capital (VC) investors exit via various routes including an initial public offering (IPO). However, in many cases their divestment is only partial. On average, Cao (2011) reports that PE investors' ownership is reduced by 33.33% around the IPO date, in line with Barry *et al* (1990) who finds that venture capitalists' ownership is reduced from 34.30% to 24.60%. Consequently, it is of interest to assess whether these financial sponsors'[44] influence on corporate policies does not terminate at the IPO date but extends to the post-flotation period.

Previous studies provide some evidence on such effects. For example, Celikyurt *et al* (2014) report that venture capitalists sit on the board of directors of mature public US firms (even on those which were not sponsored by these VCs at the time of flotation), and play a vital role in encouraging innovation. Cronqvist and Fahlenbrach (2009) analyze the effects of blockholders, including PE and VC firms, on corporate policies, such as, investment, financial and executive compensation, and conclude that they play important roles in various corporate policies. In particular, in their LBO sample, they report significant PE fixed effects related to capital expenditures, leverage, and cash reserves; while in VC-backed IPOs, the significant effects are related to investment, R&D and cash holdings. Jain *et al* (2009) find that VC-backed IPOs have a higher propensity to choose repurchases over dividends,

[44] In this paper, I refer to PE and VC investors as financial sponsors or financial investors.

partly because of VC investors' concern for market valuations at the time of their full exit, which directly influence their final returns. Overall, these studies suggest that financial sponsors influence some corporate policies after the initial public offering.

The purpose of this paper is to shed more light on the impact of PE and VC investors' *voluntary* equity retention on recently quoted firms' evolution of the board of directors, spending patterns and payout initiation mechanism. I aim to answer the following fundamental questions: a) Do pre-IPO financial sponsors play important and active roles in defining firms' corporate policies in the post-flotation period? B) Does this post-IPO involvement create or destroy value?

I test the hypotheses that PE and VC investors are likely to have different influences on certain corporate policies in the post-flotation period, which is driven by fundamentally different VC- and PE-backed IPOs' characteristics. Such differences may also lead to different market valuation of these policies.

I analyze the evolution of backed IPOs' boards of directors following the IPO. My results demonstrate that PE sponsors, who retain equity ownership voluntarily after the lockup expiration date, continue to intensively monitor financially sponsored firms by increasing the board's size, while VC holding is more likely to affect the proportion of independent directors. The results suggest that financial sponsors remain very active block holders and continue to shape the company's strategic unit (i.e. the board of directors) even when new shareholders emerge after the flotation and financial sponsors' equity ownership is significantly reduced at the IPO date. I find that bank-affiliated PE investors have a distinctive monitoring style as IPOs backed by such investors have significantly larger boards of directors in the post-IPO period.

I also investigate backed IPOs' expenditures, and find that retained VC IPOs spend significantly less on fixed assets and acquisitions than their exited peers.

Similarly, PE-backed IPOs have also smaller investment propensity, but those with low proximity to PE investors' headquarters exhibit significantly lower capital expenditures than their peers with close proximity to their financial sponsors. My results suggest that geographic remoteness increases the costs associated with monitoring firms, and financial sponsors prefer to minimize capital expenditures when they cannot intensively monitor the firm's expenses.

I, then, examine payout initiations of recently quoted financially sponsored and non-backed IPOs. I find that financially sponsored IPOs are more likely to initiate a payout via a cash dividend than a share repurchase in contrast to non-backed peers. Since cash dividends commit firms to disgorge cash to their shareholders in future years, while share repurchases are more flexible, my results imply that these financial sponsors are very effective monitors in pre-committing the IPO to regular cash payments. I further consider the sequence of IPO firms' policy changes in the post-flotation period. I document that financially sponsored IPOs which alter the board's proportion of independent directors after the flotation are more likely to initiate a payout to shareholders.

Finally, I analyse the effects of these policies on firm value. I present evidence that board size has a significant positive impact on firm value in retained VC firms suggesting that previously reported inverse relationship between Tobin's Q and board size (Yermack, 1996) does not uniformly hold in all companies. I also show that VC funds create value in the post-flotation period by shaping the board size and the proportion of independent directors, as well as monitoring the firm's capital expenditures. However, I find that, in retained PE-backed firms, capital expenditures are value destroying, while venture capitalists' inclination not to initiate dividends to shareholders is driven by some private motives which are value destroying.

My paper contributes to the existing literature along several dimensions. In contrast to previous studies,[45] I contrast two distinctive types of financial investors, who provide pre-IPO financing and gain access to insider information. The large sample enables me to investigate and differentiate between PE and VC investors' monitoring styles. While these two sponsors are relatively homogeneous in their objective of bringing their backed firms to the stock market, and they represent 62% of US IPOs and 31% of all global IPOs, respectively (Ernst and Young report, 2014), they differ in terms of the types of companies they sponsor and monitoring potentials.

The recent 2007/2008 financial crisis has not only shifted the expected number of backed IPOs, but also highlighted the importance of alternative types of financing for small and medium-sized enterprises. During the crisis, there was a low number of backed IPOs as a result of "difficult divestment environment in 2008 and 2009 – characterised by a virtually closed IPO market and almost complete absence of trade buyers" (EVCA 2010 Yearbook, p. 44). Thus, this led financial sponsors to hold on to their investments for longer. However, PE and VC firms still need to unwind their investments, and according to the Ernst and Young report (2014) there is a robust pipeline of financially sponsored IPOs in the near future. In addition, in order to avoid financial crises in the future, regulators have decided to implement the Basel III. According to the ACCA report (2011, p 3): "The credit crunch and economic slowdown that followed it have hit smaller enterprises hard. Although Basel III is often described as a recipe for mitigating and perhaps even avoiding future financial crises, its effects on lending to small businesses are generally expected to be disproportionately negative." Hence, PE and VC investors represent an important,

[45]Cronqvist and Fahlenbrach (2009) consider PE-backed firms in their analysis, while the study by Jain *et al* (2009) includes the VC sub-sample.

alternative type of financing available to small firms which were previously dependent on the bank debt.

From the institutional investors' prospective it is important to understand whether financial sponsors' involvement in portfolio companies benefit their long-run returns. Asset allocations to PE and VC sectors have increased substantially, which is driven by the asset class' expected higher return potential and diversification. For example, the Yale Endowment has invested 24.3% of their portfolio in this asset class in 2009, while in 2013 its allocation has increased to 32% (Yale Endowment Asset Allocation, 2013).

Overall, both types of financing are vital for the economy because PE investors target underperforming, mature firms with good potential or companies with entrenched management, whereas venture capitalists provide advice and resources to young, and entrepreneurial firms, which would like to reach the next development stage (Fraser-Sampson, 2010). VCs are also known to spur innovation in mature companies (Celikyurt *et al*, 2014). Hence, it is important to understand what corporate policies are under VC and PE investors' influence and whether it results in value creation in the long-run.

In addition, the results contribute to the debate as to why backed IPOs demonstrate better post-IPO performance when compared to non-sponsored IPOs (Ritter, 2013; Levis, 2011). Although Cronqvist and Fahlenbrach (2009) provide an analysis which is closely related to my paper, they base their analysis on unbalanced panel data which runs from 1996 to 2001, and their sample consists of large public corporations. In contrast, I exclusively concentrate on *recently quoted* backed US firms between 1997 and 2010, in which financial sponsors' influence is likely to remain significant as a result of large equity stakes retained after the flotation.

Secondly, they use annual ownership data, while I am able to shed light on the issue with more detailed, quarterly ownership data. Lastly, they consider only the largest owner of a firm, while I examine PE and VC investors' post-IPO ownership irrespective of whether it represents the largest class of block ownership.

Another closely related paper to my study is Boone *et al* (2007), which analyses the board of directors' evolution ten years post-flotation for firms that went public between 1988 and 1992. I concentrate on a detailed analysis of first years post-flotation, during which firms undergo the most changes and adjustments. Their analysis ends in 2002, the time the Sarbanes–Oxley Act emerged, which dramatically altered the corporate governance environment in the US. Hence, I contribute to the literature by investigating IPOs which are floated very recently. Lastly, Boone *et al* (2007) test and shed light on the drivers of public boards, while I am interested in drivers of a special group of IPOs (financially sponsored), and, most importantly, I investigate the impact of financial sponsors' ownership retention on the board structure evolution post-flotation.

Despite the widespread view that financial sponsors engage in active restructuring of portfolio firms, little research is done on the extent these investors remain active shareholders in the post-flotation period. I examine the inter-linked corporate policies, which have a direct impact on firm value. Yermack (1996) finds that board size and firm value are inversely related, thereby suggesting that small boards are more effective and functional. With respect to spending patterns, it's not uncommon for cash to be used by managers for their private benefits at the expense of other shareholders. I expect that backed IPOs with *continued* support and presence of financial sponsors post-flotation represent a separate class of IPOs, in which pre-IPO shareholders can intensively monitor managers' actions even post-flotation. These

IPOs differ from both non-backed and backed peers, which are fully exited by PE and VC firms after the lockup expiration date. Lastly, an examination of dividends and share repurchases is important since payouts contribute to shareholders' return, which is particularly important in bear period when capital gains are not generated.

The rest of the paper is structured as follows: Section 2 reviews prior research and presents hypotheses' development. Section 3 describes the data and methodology. Section 4 presents empirical results and Section 5 reports robustness checks. Section 6 concludes the paper.

3.2 Literature Review and Hypotheses' Development

This paper combines two streams of literature. The first set of studies document how PE and VC firms add value to portfolio companies. The second examines the continued PE and VC investors' post-offering ownership and its effect on performance.

To avoid the market's scrutiny, PE investors take private their mature, large firms with high cash flows to closely examine their corporate policies, shape their operations, and restructure their assets and liabilities, with an objective of creating value. In contrast, VC investors tend to invest in high growth, small and young new companies. After providing the funding, they monitor their portfolio firms through their usual large equity stakes and their representation on the board of directors. Previous studies demonstrate that PE investors significantly engage in defining portfolio firms' governance, capital structure (Jensen, 1989), expenses (Lichtenberg and Siegel, 1990; Muscarella and Vetsuypens, 1990), while VC sponsors actively shape the board of director's functionality, composition and size (Baker and Gompers, 2003; Hochberg, 2012).

PE and VC investors' involvement in companies result in improved operations, governance, board of directors' efficiency, innovation and performance. For example, Celikyurt *et al* (2014) find that VC directors significantly improve mature firms' R&D and innovation. They conclude that VC investors can create value even in public companies by reporting the market's significant positive reaction to mature firms' appointments of directors, who are affiliated with a VC firm. Similarly, Cao (2011) reports that continued PE sponsors' (or buyout) equity holdings following a market admission are associated with good operating performance of portfolio firms. Ritter (2013) and Levis (2011) demonstrate that the long-run performance of backed-IPOs is superior to non-backed IPOs in the US and UK, respectively.[46]

Since VC and PE investors have material, significant holdings in IPOs, a high proportion of their return is not realized at the IPO date, or at the lockup expiry date.[47] The extant literature demonstrates that PE investors (Cao, 2011) and venture capitalists (Barry *et al*, 1990) retain equity ownership and representation on the board of directors. Hence, the return on a large proportion of their initial ownership is dependent on the IPO's share price performance, which can be affected by their continuing activism.

Levis (2011) reports that, before the flotation, PE investors are involved in firms for 3.7 years, compared to 4.5 years for VC firms. This holding period is likely to be sufficient for financial investors to set all policies optimally. However, at times of bear markets or low valuations, financial sponsors tend to hold on to their investments for longer. Cao (2011) reports that PE sponsors restructured and kept portfolio companies private for, on average, 1.39 years in 1998. Following the dot

[46] However, the performance of financially sponsored IPOs differs across periods. For example, Ritter (2014) shows that VC-backed IPOs underperformed non-financial peers during the 1999-2000 and 2001-2012 period. In contrast, during the following periods VC-IPOs demonstrated superior performance: 1980-1989 and 1990-1998.

[47] The average lockup duration is 180 days in the US (Brav and Gompers, 2003).

com bubble burst, the holding period increased to 6.74 years in 2002. Longer holding periods result in lower IRR and put pressure on general partners to realize high returns. Therefore, I expect PE and VC investors to continue monitoring firms by imposing stricter control so that they can accumulate more value and realize higher returns at the time of their full exit in the future.

3.2.1 The Board of Directors' Size and Composition

Past studies identified the board of directors as one of the most important policies PE and VC investors change most frequently in their portfolio companies. The board characteristics of backed and non-backed firms differ significantly. For example, Acharya *et al* (2009) report that a public firm's board consists of 11.4 members, whereas the average PE-backed board's size is 7-8 members. When firms are taken over, PE fund representatives tend to replace outside directors (Cornelli and Karakas, 2010) and reduce the board's size, resulting in better collaboration and more efficient functioning (Acharya *et al*, 2009). Similarly, in VC-backed firms, the board structure is altered after the first financing rounds. More specifically, previous studies identified in VC-backed firms extensive management turnover (Kaplan and Stromberg, 2004), and an increase in VC investors' representation and the proportion of independent directors in order to reduce CEO's ability to exert pressure on members of the board (Baker and Gompers, 2003; Hochberg, 2012). These alterations in executive directors and board structure result in more effective corporate governance (Lerner, 1995).

Baker and Gompers (2003 p. 570) argue that "Because existing shareholders bear the cost of suboptimal governance, board structure is more likely to be chosen optimally at the time of the IPO". However, it is reasonable to expect that, following

an initial public offering, backed IPOs' corporate policies are likely to alter and slowly adjust to the industry average. Levis (2011) reports patterns of significant reduction of leverage in PE-backed IPOs during the first year of being publicly quoted, which results in almost identical debt ratio to their industry peers. However, the post-IPO continued presence of financial sponsors' is likely to reinforce the focus on value creation by retaining the optimal board structure. In my study, I concentrate on the board's size, which has significant implications for members' collaboration (Acharya *et al*, 2009), and the proportion of independent directors, which is vital for corporate governance.

PE and VC investors provide financing to different types of companies. I expect the extent and effect of continued PE and VC monitoring to be different due to fundamentally different IPO firms' characteristics. PE investors primarily target large, old, public firms which are at the maturity stage of the business development cycle, and in non-high tech industries (Guy-Fraser, 2010; Levis, 2011). PE investors usually look for mature firms, with free cash flows and high debt potentials, which principally underperformed as a result of entrenched managers. Prior studies have reported that larger firms have more information available to the market (Barry and Brown, 1984), and are followed by more analysts, which leads to less uncertainty regarding insiders' actions. Moreover, since PE investors usually target firms with high free cash flows in order to be able to service debt in a timely manner, these firms are more prone to agency conflicts. Hence, on average PE-backed portfolio firms can be characterized by low information asymmetries and high agency conflicts.

In contrast, VCs invest in very young firms, which have not had commercial sale of products/services (Guy-Fraser, 2010). They primarily invest in high-tech firms, which are at the product development stage and are in the start-up stage of the

business cycle. VCs invest in firms with prospective ideas rather than current profitability. For example, Kaplan *et al* (2006) track VC backed portfolio firms from business plan stage to an IPO, and find these firms' business lines and ideas remain unchanged. Also, since these firms are private, there is a very limited information about the company and its prospects. For example, Megginson and Weiss (1991) find that VC investors provide certification of IPOs by reducing the information asymmetries and maximizing proceeds for the issuing firm. Overall, VC-backed portfolio companies can be characterized by high information asymmetries and low agency conflicts.

However, as a result of fundamentally different PE-backed and VC-backed companies' characteristics, I expect PE and VC investors to shape differently the board of directors' characteristics. The board of directors have three main functions: monitoring, advising and contacts/network. For PE-backed IPOs, monitoring functions of the board is the most vital one because of the need to mitigate agency conflicts of the free cash flow as their target firms are likely to be mature cash cows. In contrast, for VC-backed companies the advisory and contact roles are more likely to predominate as their young high growth firms need to reduce their information asymmetries. I summarize these arguments in the following matrix.

Matrix 1. Financially Sponsored Firms' Need for Various Board's Functions

	The Board of Directors' Functions		
IPOs	**Monitoring**	**Advising**	**Contact**
PE-Backed	Very high	Low/moderate	Low/moderate
VC-Backed	Low	Very high	High

Hence, I expect PE investors to primarily shape the size of the board of directors in the post-IPO period. Although past studies report smaller boards to be more efficient in making decisions (Acharya *et al*, 2009), an additional member on the board can bring valuable expertise, strategic leadership, performance and governance

management. For monitoring purposes larger boards can be very beneficial. In contrast, VC-backed IPOs' focus is on mitigating information asymmetries, and having a higher proportion of independent directors on the board is beneficial. Independent directors solve the following two main, among others, problems (Gordon 2008, p. 1469): "First, they enhance the fidelity of managers to shareholder objectives, as opposed to managerial interests or stakeholder interests. Second, they enhance the reliability of the firm's public disclosure..." Overall, independent directors reassure and certify (to an extent) the soundness of the firm. These arguments motivate the following hypothesis:

Hypothesis 1: There is a significant relationship between PE and VC voluntary retention and IPO's board features in the post-flotation period, but while PE will focus on the mitigation of the free cash flow problem, VC funds will set a board that will advise and generate contacts.

3.2.2 Investment Policies

In relation to investment policies, I examine capital and acquisition expenditures. Brau and Fawcett (2006) find that Chief Financial Officers (CFOs) view an IPO as a way to create an acquisition currency. Schultz and Zaman (2001) report that many IPOs floated during the dotcom bubble demonstrate high post-IPO acquisition activity. A recent study by Celikyurt *et al* (2010) find that future acquisitions is an important motive for firms to go public. The authors report that 31% of recently quoted firms engage in an acquisition within the IPO year, and the vast majority (77%) of IPOs conduct at least one acquisition transaction within five years post-flotation. Brau *et al* (2012) report that IPOs which engage in an acquisition

within the first year of flotation significantly underperform in the aftermarket compared to nonacquiring IPOs.

Potential sources of capital gains include (but not limited to) investments in positive NPV projects, capital expenditures, as well as research and development (R&D). PE and VC investors provide funding to very distinctive types of companies. VC investors provide funding to firms with high information asymmetries as a result of their young age, development stage, high-tech affiliation and high risk of failure. According to the joint report by PricewaterhouseCoopers and National Venture Capital Association (2013), venture capital investors made the majority of investments in 2013 in the following sectors[48]: software (49%), biotechnology (13%) and IT Services (9%). Hence, fixed assets' maintenance, improvement and investment are critical for success of these growth firms with high investment opportunities. The high growth feature of these firms imply low agency conflicts, and therefore, these is less need for VC investors to shape firms' expenditures since they are most likely to be used to finance growth.

In contrast, PE investors primarily focus on mature firms with high level of free cash flows, and it is not uncommon for PE groups to target publicly quoted firms. Shapiro and Pham (2009) report that manufacturing (non-manufacturing) firms' capital expenditures increase by 9.10% (17.30%) following the private equity financing. Harford and Kolasinski (2010) report that PE investors reduce firms' overinvestment following the buyout (or PE) transaction. PE-backed firms' features (especially its mature stage and limited growth opportunities) imply high agency costs. These firms are likely to suffer from overinvestment and asset substitution

[48] Presented results refer to the first three quarters of 2013. Source of data: <http://www.nvca.org/index.php?option=com_content&view=article&id=78&Itemid=102>.

problems. Hence, more PE investors' monitoring is required in these firms in the post-flotation period.

More specifically, I expect PE investors' retention to have a negative effect on the firm's expenditures. PE investors' goal, especially those with retained post-IPO ownership, is to maximize their returns, minimize potentially wasteful investments, overinvestments and ensure that managers are not involved in empire building. Hence, it's likely that these investors would aim to minimize expenditures in unprofitable projects. Fundamentally different characteristics of PE- and VC-backed firms, and how they affect my expectations are summarized in Matrix 2.

Matrix 2. Financially Sponsored IPOs' Characteristics and Hypotheses.

	PE-backed Firms	**VC-backed Firms**
Characteristics	Mature, large, public (in some cases), old, high debt, high free cash flows, non-high tech affiliated. **Overall: low information asymmetries but high agency conflicts.**	High growth, private, young, development stage, low debt, high-tech affiliated. **Overall: high information asymmetries but low agency conflicts.**
Board Size and Composition	The monitoring function of the board is the most vital one for PE-backed firms to mitigate agency conflict. There is a high need for PE investors' monitoring, hence, they impose larger boards.	The advising and access to contacts' functions of the board are most important for VC-backed firms. High need for firms to reduce information asymmetries, hence, VC investors impose boards with higher proportion of independent directors.
Investments	PE-backed firms are subject to overinvestment and asset substitution problems. Due to the mature stage of firms, there is limited growth and high potential for negative NPV projects. These firms require PE investors' post-IPO monitoring, and PE investors are likely to minimize any wasteful expenditures.	These firms are high growth, with high investment opportunities. Hence, low potential for negative NPV projects, and hence, less need for VC investors' monitoring of expenditures.

These arguments lead to the following hypothesis:

Hypothesis 2: There is a significant relationship between PE investors' equity retention and IPO firm's capital and acquisition expenditures, while no significant effect of retained VC investors' ownership on expenditures.

3.2.3 The Payout Policy

Quoted firms return cash to their shareholders through dividends and share repurchases. Dividends initiations are primarily affected by institutional shareholders' demand and sustainable boosts in earnings. Brav *et al* (2005) document that CFOs consider share repurchases to be a much more flexible payout method, which, in contrast to dividends, does not require smoothing and the market does not penalize the firm in case they are reduced or omitted. Firms are likely to repurchase their shares for the first time in case the firm's shares are "undervalued, when they have excess cash or fewer investment opportunities, when their stock's liquidity increases, and when pressure comes from institutions" (Brav *et al*, 2005 p. 517).

Grinstein and Michaely (2005) examine the relationship between institutional ownership and mature public firms' payout policies. They find little evidence that an increase in institutional ownership leads to a boost in dividends or share repurchases. Kale *et al* (2012) concentrate specifically on dividend initiations by newly quoted firms and find support for the dividend-signalling hypothesis. Jain *et al* (2009 p.1275) state that "Initial public offering (IPO) firms typically go public on the promise of growth thereby conditioning investors to expect capital gains rather than dividends or share repurchases during the post-IPO phase." This is especially the case for backed IPOs with significant PE/VC investors' ownership concentration, whose final return depends on the firm's market valuation at the time of their full exit post-flotation.

A large proportion of financial sponsors' returns is not realized at the IPO date. Levis (2011) reports that on average PE (VC) sponsors retain 26.10% (23.10%) of the UK floated firms' outstanding shares immediately post-quotation. Using a sample of backed IPOs quoted on the US stock markets, Lasfer and Matanova (2013) find that around the admission date PE investors reduce their pre-IPO ownership from 56.70% to 23.97%, while VC syndicates' average ownership decreases from 40.09% to 25.54%. This post-IPO ownership retention is partly explained by the lockup agreement, which limits pre-IPO investors from selling their stakes for a certain period of time after the flotation. Brav and Gompers (2003) find that the average lockup duration is 180 days in the US, while Hoque and Lasfer (2013) report that in the UK the average length is 365 days. Hence, following the flotation financial sponsors pay particular attention to capital gains because a vast majority of their returns remain unrealized and dependent on the share price performance at the time of their full exit after the flotation.

For PE and VC investors, who retain ownership after the flotation, it is important to demonstrate to the market that the company's focus remains on value enhancing activities. Harford and Kolasinski (2010) find that there is no correlation between special dividends to sponsors and future firm distress. However, the market might misinterpret a dividend initiation by retained backed IPOs as an attempt by financial sponsors to increase their payout/return, as opposed to the management's positive signal of the firm's future prospects. For example, there are some cases when PE investors increase portfolio firms' debt in order to pay themselves a special dividend, which ultimately allows the financial sponsors to recoup its original investment and make a return. However, sometimes it leads firms into distress. This is precisely what BC Partners did in Phone's 4U portfolio firm (Ford, 2014). Moreover,

dividend initiation may signal a firm's approaching maturity (Grullon *et al*, 2002), underinvestment or simply the investors are pushing to disgorge cash. To avoid such market reaction, I expect the following:

Hypothesis 3: These is a negative relationship between PE/VC ownership retention and the propensity to initiate a payout post-flotation ceteris paribus.

Dividends and share repurchases both represent a cash distribution method. Dividend initiations imply a significant change in corporate policy, which has long-term implications for the firm's future payout policy. Not only the company is expected to maintain at least the same dividend level, but also to consistently make such payments in the long-run. In contrast, share repurchases allow the company to decide how many shares to repurchase and at what price. Moreover, share repurchases could be revoked any time after announcement, whereas dividends are considered irrevocable and dividend reductions/cancellations are significantly penalized by the market. Michaely *et al* (1995) report that dividend omission announcements are accompanied by an average share price decrease of 7%. Overall, share repurchases represent a more flexible form of cash distribution (Brav *et al*, 2005).

IPOs with financial sponsors' voluntary ownership represent a group of firms with special type of block holders. In contrast to other institutional shareholders, financial sponsors exhibit the following distinctive characteristics: PE and VC investors operate under the approach of a fund's termination date (10-year fixed life), longer holding period, the pressing need to realize high returns (in order to attract new investors for future funds) and obligation to make distributions to their investors (limited partners, or LPs). Therefore, in case financially sponsored IPOs make a cash distribution in the post-flotation period, they are more likely to do so by means of

share repurchases than dividends as a result of PE/VC investors' features and more flexible nature of share repurchases.

In addition, I shed light on whether the board's changes represent the beginning of backed IPOs' alterations and tuning/evolution of other major firms' corporate policies post-quotation. The board of directors represents a strategic unit which oversees operations, provides strategic guidance, influences various corporate policies, as well as reinforces the firm's focus on value creation, strategy and performance via tuning of various corporate policies. Hence, I hypothesize that changes in a firm's corporate policies originate at the board of directors' level and spread to other policies in the post-IPO period. More specifically, I expect firms which change the board's size or proportion of independent director to be more likely to initiate a considerable change in the payout policy (i.e. initiate a cash dividend or share repurchase) than firms which do not make any changes to the board of directors. This leads to the following hypothesis:

Hypothesis 4: Significant changes in financially sponsored IPOs' payout policy occur subsequent to the board of directors' alternations.

Lastly, I hypothesize that PE and VC investors are able to create value in their portfolio firms even in the post-flotation period by tuning corporate policies such as the board composition, investment expenditures and payout. For example, the board size has important implications for firm performance. Yermack (1996) finds an inverse relationship between board size and firm value. Larger boards have higher monitoring capabilities, however this benefit could be outweighed by costs such as a slower decision making (Lipton and Lorsch, 1992), inefficient communication and

free-riding (i.e. dysfunctional boards). However, PE and VC investors act as monitoring agents who are directly interested in management's focus on value maximization and retention of a high level of corporate governance because in *retained* backed IPOs financial sponsors have a large proportion of unrealized returns, whose return dependent on the share price at the time of their full exit. By retaining shares in IPO firms, these investors are able to continue their monitoring and setting corporate policies at value maximizing level, which would result in value creation. This leads to the following hypothesis:

Hypothesis 5: In retained backed IPOs, financial sponsors continue to create value by shaping certain corporate policies (board composition, investment and payout policies).

3.3 Data and Methodology

The initial sample consists of IPOs floated on the US stock markets between 1997 and 2010, which are identified from SDC New Issues database.[49] Names of backed IPOs and classification of PE and VC firms are gathered from Liu and Ritter (2011) and SDC Database. Firms which belong to finance and utility industries are excluded from the sample. To be included in the final sample, a firm must have financial data in COMPUSTAT and ownership data in Thomson One Banker. The final sample consists of 381 PE-backed, 699 VC-backed, and 505 non-backed IPOs.

I split my backed sample into IPOs with retained voluntary ownership and exited firms. “Retained IPOs” are backed IPOs in which PE and VC syndicates have retained some ownership at first quarter post lockup expiration date, and “Exited

[49] I do not consider IPOs floated before 1997 because Thomson One Banker offers ownership coverage starting from 1997.

IPOs" are those backed firms in which financial sponsors have sold all their equity stake at first quarter post lockup expiration date. It is not viable at the moment to examine PE and VC firms' ownership adjustments made on the exact date of lockup expiration. Thomson One Banker provides ownership data in March, June, September and December of each fiscal year. As a result, first Thomson One Banker ownership quarter post the unlock day is used for the purpose of this analysis. For example, the IPO date of Curon Medical Inc is 22nd September, 2000. 180 day lockup period expires on 21st March, 2001. Hence, I use the date of the first Thomson One Banker's quarter post lockup expiration (i.e. 31st March, 2001) to assign this firm into retained or exited sample.

Perfect Filings database is used to gather all IPO prospectuses, which are subsequently used in manual collection of PE/VC firms' names, pre/post-IPO ownership information of financial sponsors, management and institutional investors. Stock prices and indices are downloaded from DataStream. The board of directors' characteristics are collected from BoardEx database. For the purpose of this analysis, I collect five years of the board's data: starting from the IPO year (t_0) to four years post-flotation (t_{+4}). BoardEx database does not provide data for all firms in my final sample. Hence, I found data for 237 non-backed IPOs (representing 46.93% of the original sample size), 388 (55.51%) VC-backed IPOs, and 301 (79%) PE-backed IPOs. The vast majority of missing data is concentrated in 1997-1999 period.

Each firm is tracked from the IPO date for three years post-flotation or until the end of 2012 (whichever is earlier) in order to identify whether the firm has initiated any form of payout. For dividend initiations, I only consider firms which pay an ordinary regular cash dividend. Consistent with Jain *et al* (2009) I only retain firms

with the following CRSP distribution codes: 1212, 1232, 1242 and 1252.[50] SDC Mergers and Acquisition database is used to identify repurchase initiations, transaction dates and details. I consider the first post-IPO payout distribution method in order to divide firms into dividend-, repurchase- and non-initiators. My final sample consists of 102 dividend initiators, 36 repurchase initiators and 1447 non-initiators.[51]

Additionally, the following information is collected for the purpose of this paper: firm age (incorporation dates are taken from Jay Ritter website), dividend premium (Baker and Wurgler, 2004), and nine-point underwriter reputation ranking (Carter, Dark, and Singh, 1998).[52] SDC database is used to collect IPO specific data (number of proceeds, underwriter names, offer price), whereas PE and VC funds' characteristics are gathered from Thomson One Banker.[53]

I test the proposed hypotheses using univariate and multivariate analyses. The expectation of the first hypothesis is tested by means of the following logit model, where the dependent variable equals one if the board size (composition) at fiscal year t is the same as the board size at IPO year (t_0), and zero otherwise:

$$\mathrm{Pi}(\text{'Board's feature remains unchanged' dummy} = 1|\mathrm{Xi}) = \frac{\exp(\mathrm{X_i B})}{1+\exp(\mathrm{X_i B})} \quad (1)$$

X_i is a vector of firm specific variables such as PE dummy, retention dummy, management ownership, leverage, logarithm of market value, return on assets, R&D scaled by total assets, capital expenditure scaled by total assets, cash flows scaled by total assets, firm age at IPO date, high-tech and backed dummy. B is the vector of

[50] Descriptive statistics for special dividends with CRSP distribution code 1272 is provided in one of the summary statistics tables. However, these statistics do not refer to payout *initiations* via special dividends. Special dividends are paid by firms after they have already initiated some form of payout to shareholders such as ordinary dividend or share repurchase.
[51] Nine firms paid dividends and repurchased shares in the post-IPO period. These firms were assigned into either dividend or repurchase initiator sub-samples based on their *first post-IPO* payout method.
[52] Updated version of the ranking is collected from the Jay Ritter website.
[53] Fund characteristics are not available for all firms in the sample. In order to avoid reducing the sample size, I include fund-specific variables in separate regressions.

parameters to be estimated. Definition and data sources of all variables used in this analysis can be found in the Appendix. The variable of interest is the retention dummy, whose coefficient I expect to be significant and positive. This is driven by financial sponsors' inclination to retain in place the policies they've set at optimal levels pre-flotation.

I perform the following multivariate analysis to examine hypothesis 1, where the dependent variable is either equal to the number of directors on the board or the proportion of independent directors (the latter specified in decimals):

$$Board\ Size=\beta_0 + \beta_1 Retention\ Dummy + \sum\beta_k\ (Control\ variables_k) + \varepsilon \quad (2a)$$

$$Proportion\ of\ Independent\ Directors=\beta_0 + \beta_1 Retention\ Dummy + \sum\beta_k\ (Control\ variables_k) + \varepsilon \quad (2b)$$

Consistent with existing literature (Lasfer, 2006; Masulis and Mobbs, 2010), I use the same control variables as in Model (1) with industry and year dummies. I run the above models separately for PE and VC samples, and according to my hypotheses, I expect β_1 to have a positive and significant effect on PE-backed IPOs' board size. While, I expect β_1 to have a positive and significant effect on VC-backed IPOs' proportion of independent directors.

In addition, I contribute to the literature by using PE and VC fund's bank affiliation as a proxy for financial sponsors' monitoring level. Bank-affiliated PE and VC funds (i.e. those whose holding company is a bank) represent a distinctive type of financial investors. Previous papers (Fang *et al,* 2013; Lopez-de-Silanes *et al*, 2011) demonstrate that investments by bank-affiliated PE houses represent an important economic phenomenon: they sponsors around 30% of all US and international private equity investments. Hence, these financial sponsors are major players in private equity industry. Fang *et al* (2013, p. 2141) point out that "Standard private equity groups by

definition can only act as the equity investor, but not the debt financier." In contrast, bank-affiliated funds can act as either an equity investor or both (equity and debt financier). Fang *et al* (2013) find that transactions of bank-affiliated and independent PE houses are similar with respect to the portfolio company industry and deals' characteristics, and conclude that bank-affiliated PE houses do not make superior equity investments when compared to independent PE houses.

Caselli *et al* (2010) examine various Italian PE funds' ownership structures and analyze their impact on the portfolio firms' performance. They find that bank-affiliated funds invest larger amounts and stay involved in companies for longer than PE funds with other ownership structures. Moreover, Caselli *et al* (2010) demonstrate that, during the holding period, the general partners of bank-affiliated funds sit on a higher number of boards than managers of funds with other ownership structures.

Hellmann *et al* (2004) concentrate on bank-affiliated VC funds instead, and find that their strategic goal of providing venture funding is to build relationships with firms, which are likely to require loans in the future. They demonstrate that bank-affiliated VC funds' investment style differs significantly from others. VC bank-affiliated funds invest in later rounds, finance larger deals in larger syndicates, concentrate on firms outside the VC cluster zone,[54] and most importantly strategically target portfolio firms concentrated in high debt industries. Hence, previous studies report that PE and VC funds with different ownership structures have different strategic goals, investment and monitoring styles.

The sign of the relationship between financial sponsors' bank-affiliation and board size is unclear. On the one hand, I expect IPOs backed by bank-affiliated funds to have smaller boards post-flotation as past studies found these boards to be more

[54] California and Massachusetts are the two states with high VC investment concentration (Hellmann *et al*, 2004).

effective. On the other hand, bank-affiliated funds represent a distinctive class of investors, which are interested in firms' strong performance and ability to take on loans in the future. In order to ensure this, bank-affiliated PE and VC investors might add an additional member to the board with specialized knowledge, who can boost monitoring capabilities. Similarly, larger boards with a higher proportion of independent directors are beneficial for these firm. As a result of financial sponsors' high proportion of unrealized returns at the IPO and direct interest in ensuring the company performs well in order to require future loans, I expect the following: i) There is a significant (positive or negative) relationship between PE/VC fund's bank-affiliation and the portfolio firm board's size. ii) IPOs backed by bank-affiliated PE/VC funds impose boards with higher proportion of independent directors (significant and positive β_2 in model 2d). To test these predictions, I add bank-affiliation dummy and expect to find significant and positive β_2 coefficient in both models:

$$Board\ Size=\beta_0+\beta_1 Retention\ Dummy+\beta_2 Bank\ Affiliation\ Dummy+\sum\beta_k\ (Control\ variables_k)+\varepsilon \quad (2c)$$

$$Proportion\ of\ Independent\ Directors=\beta_0+\beta_1 Retention\ Dummy+\beta_2 Bank\ Affiliation\ Dummy+\sum\beta_k\ (Control\ variables_k)+\varepsilon \quad (2d)$$

Among the control variables, I include leverage and management ownership to proxy for the severity of agency conflicts. Leverage acts as an additional monitoring and disciplinary mechanism, whereas management ownership aligns the interests of managers and those of shareholders, thereby reducing the need for a higher proportion of independent directors.

To test the predictions of the second hypothesis, I run the following multivariate OLS (Model 3) for PE and VC samples separately:

$$CAPEX/TA \text{ or } ACQ/TA = \beta_0 + \beta_1 Retention\ Dummy + \beta_2 Bank\ Affiliated\ Dummy + \beta_3 Low\ proximity\ dummy + \sum \beta_k\ (Control\ variables_k) + \varepsilon \quad (3)$$

In line with previous studies (e.g. Opler *et al*, 1999), the following control variables are used: cash flows, M/B ratio, sales, sales growth, leverage, R&D, no payout dummy. For PE-backed IPOs, I expect to find β_1 significant and negative, while for VC-backed IPOs I do not expect to find a significant relationship. Low geographic proximity of financial sponsors to their portfolio firms constrains financial sponsors' ability to monitor the firms' operations. Lerner (1995) shows that VC investors' distance to their portfolio firms is an important determinant of VC board membership as a result of lower cost associated with monitoring local companies. Hence, in order to minimize wasteful investments, I expect IPOs backed by funds with low geographic proximity to spend significantly less on capital and acquisition expenditures (β_3).

I follow Kale *et al* (2012) to compute the likelihood of post-IPO payout initiation, and assign an IPO as a non-payout initiator firm in all years after IPO year until the year it initiates some form of a payout. Then, following the payout initiation year, it is eliminated from the sample. My proposed methodology and model specification allows to understand why, in a particular year, one IPO firm initiates some form of payout, whereas others do not.[55] I use the basic form of the logit Model (4), where the dependent variable equals one if the firm has initiated a payout (dividend or share repurchase) at fiscal year t, and 0 otherwise. The main explanatory variables are the following dummies: retention, no board size change$_{t \text{ vs IPO year } t}$, no board composition change$_{t \text{ vs IPO year } t}$.

[55] Kale *et al* (2012 p.372) point out that "The assumption here is that the decision to initiate dividends or not is made every year and, thus, each firm that has not initiated dividends in one year is, in effect, a new firm that will be making the decision next year."

$$\text{Pi}(\text{Payout dummy} = 1|\text{Xi}) = \frac{\exp(X_i B)}{1+\exp(X_i B)} \quad (4)$$

In addition, the following firm specific variables (X_i) are included in the analysis: M/B ratio, capital and R&D expenditures, leverage, return on assets, first day return, insider ownership retention, underwriter reputation, firm age, dividend premium, NYSE dummy, retained earnings, logarithm of total assets, cash and PE dummy. According to hypothesis 3 and 4, I expect the retention, no board size change$_t$ vs IPO year t, no board composition change$_t$ vs IPO year t coefficients to be negative and statistically significant.

I adopt a close approximation of the model used by Jain *et al* (2009) to assess the choice of the payout initiation mechanism, where the dependent variable is one if the firm has initiated a payout via dividends, and zero if by share repurchases.

$$\text{Pi}(\text{Divident Payout dummy} = 1|\text{Xi}) = \frac{\exp(X_i B)}{1+\exp(X_i B)} \quad (5)$$

I use the basic form of the logit Model (5), where X_i is a vector of firm specific variables such as high-tech industry, number of planned proceeds uses, primary use of proceeds (corporate purposes) dummy, primary use of proceeds (retiring/refinancing debt) dummy, capital expenditure, R&D, dividend premium, leverage, return on assets, firm age at IPO date, sales growth, cash flows, logarithm of IPO proceeds, underwriter reputation, backed, PE and retention dummies.

The main coefficients of interest are the backed and retention dummies, whose coefficients I expect to be negative. This finding would imply that backed and retained financially sponsored IPOs are more likely to choose repurchases as their payment initiation mechanism than dividends in comparison to non-backed and exited peers.

In addition, I examine the impact of various corporate policies on financially sponsored IPOs' firm value. I replicate the model proposed by Yermack (1996) with

the addition of several explanatory variables as shown below. Consistent with Yermack (1996), I use Tobin's Q as a measure of market valuation.

$$Tobin's\ Q = \beta_0 + \beta_1 Retention\ Dummy + \beta_2 Log(Board\ Size) + \beta_3 (Log(Board\ Size)*Retention\ Dummy) + \beta_4 Proportion\ of\ Independent\ Directors + \beta_5 (Proportion\ of\ Independent\ Directors*Retention) + \beta_6 ACQ/TA + \beta_7 ACQ/TA*Retention + \beta_8 Capex/TA + \beta_9 Capex/TA*Retention + \beta_{10} No\ Payout\ Dummy + \beta_{11} No\ Payout\ Dummy*Retention + \sum \beta_k (Control\ variables_k) + \varepsilon \quad (6)$$

β_2 is of particular interest in backed IPOs, and according to the study by Yermack (1996), I expect it to be negative. Since having boards with higher proportion of independent directors is viewed as a good corporate governance and is beneficial for the firm, I anticipate β_4 to be positive. Also, I expect the acquisition (β_6) and capital expenditures (β_8) to positively contribute to firm value if it's invested in positive NPV projects and not used for empire building. β_{10} is likely to be positive if cash is not distributed to shareholders because the company has high growth opportunities and there is no management entrenchment. Since I expect that the continued involvement of financial sponsors to be beneficial for firm's value in the long-run, I anticipate to find the coefficients of interaction variables ($\beta_3, \beta_5, \beta_7, \beta_9$ and β_{11}) to be positive and statistically significant.

3.4 Empirical Results

Table 1 presents the descriptive statistics for PE, VC and matched samples. In order to minimize potential biases and control for the macroeconomic and industry variables, I create matched samples for PE and VC IPOs. Non-backed IPOs, which have been floated between 1997 and 2010, are matched by 2-digit SIC code and size (market value at IPO). This is especially important with respect to the board's size because previous studies found that there is a positive relationship between firm and board size (Yermack, 1996).

I find the PE-backed sample is significantly larger in terms of assets, exhibit higher cash flows, more profitable (in terms of return on assets) and levered than VC and matched firms, which is in line with previous literature (Levis, 2011). PE-backed IPOs hold only 18% of total assets in cash and short-term investments, whereas VC IPOs' average cash ratio is 76% (Panel A).

PE and VC investors' preference to provide capital to distinctive types of companies is captured by R&D, firm age and high-tech affiliation statistics. VC IPOs' average R&D-to-total assets ratio is 0.24 in comparison to 0.02 of PE IPOs. 46% (20%) of VC (PE)-backed IPOs are concentrated in high-tech industries, and it takes 6.63 (28.58) years from incorporation date to get a listing on the US stock markets for these firms. These findings are generally consistent with previous studies, which report average VC-backed IPO firms' age of 5.67 years (Mellare and Frino, 2010), and PE-IPOs' of 36 years (Jenkinson and Sousa, 2014).[56] I find that VC (PE)-backed firms are quoted at a significantly younger (older) age compared to matched non-backed companies (*t-coefficients* of 3.94 and -6.72 are significant at 1 percent level). In comparison to matched firms, financial sponsors are able to underwrite IPOs with significantly more reputable investment banks, which demonstrates the financial sponsors' connections and certification role. Financial sponsors' strategic focus and planning is captured by the fact that at the time of flotation backed IPOs list three distinctive (planned) proceeds' uses in their prospectuses compared to two of the non-backed sample.

Even after controlling for firm size and industry, the boards' features of backed and matched companies differ significantly. Panel B shows that matched IPOs have eight members on the board of directors, and 60% of the board is represented by

[56] The difference between my findings and past studies can be explained by fluctuating IPO firm age. Ritter (2014) reports that the median firm age fluctuates from 5 years in 1999 to 15 years in 2009.

independent directors, which is significantly lower than in financially sponsored IPOs. PE-backed IPOs maintain larger boards of directors post-flotation than VC IPOs (9 and 8 members, accordingly), yet they do not exceed the earlier proposed optimal board size of 8-9 members (Lipton and Lorsch, 1992;[57] Jensen, 1993). The proportion of independent directors is significantly higher in VC boards (69%) than in PE boards (63%). These findings are consistent with the nature of companies PE and VC investors choose to finance. Mature PE-backed firms require larger boards to oversee a broader scope of more diverse, complex operations and provide strategic guidance to firms with high agency conflicts; whereas young, risky, high-tech VC IPOs call for more independent, strategic judgement and monitoring of ventures with high asymmetric information. My findings are consistent with Acharya *et al* (2009), who find that backed, public UK firms have 7-8 members and maintain 57-70% of independent non-executive directors.[58]

At the time of flotation, executive directors of backed IPOs have been in the organization for an average of four years and three years on the board. Hence, executive directors spend a year in the organization before being promoted to a board position. Interestingly, executive directors of VC-matched companies have been in the organization and on the board for a significantly shorter period of time than in VC-backed IPOs. This is in contrast to my initial expectation because usually financial sponsors alter the board significantly during the restructuring process (Cornelli and Karakas, 2010). My results suggest that financial sponsors restructure the board (if necessary) soon after their initial involvement, thereby allowing more time for directors to closely examine and contribute to the firm's success before the quotation. Financial sponsors ensure that independent directors are well educated and informed

[57] Lipton and Lorsch (1992) recommend the maximum of ten directors on the boards.
[58] Acharya *et al* (2009) report these results based on interviews, and do not differentiate on how long these firms have been quoted on the UK stock markets.

about the business by getting supervisory/independent directors involved in backed IPOs two years before the flotation, in contrast to only one year in matched samples.

The vast majority of firms (85%) alter the board's features (size and composition) within four years of quotation.[59] This trend captures IPO firms' adjustment to the industry-average, or/and as the firm matures these changes occur naturally. The first financially sponsored firm board's size and composition alterations take place toward the second year of flotation. Panel C presents summary statistics of spending patterns demonstrated by various subsamples. The average capital (acquisition) expenditure to total assets is 10-11% (5%) for my final sample of backed IPOs, which is significantly higher than those demonstrated by matched samples.

[Insert Table 1]

Table 2 presents descriptive statistics of payout initiation mechanisms. Backed-IPOs differ significantly with respect to the propensity to initiate dividend payments: a significantly larger (smaller) proportion of PE (VC)-backed IPOs have chosen to initiate cash distributions to shareholders via dividends than non-backed IPOs. This is consistent with the notion that PE-backed IPOs are more mature firms with low growth opportunities, high free cash flows and agency conflicts in comparison to VC IPO, which need internal funding to invest in future growth. Hence, PE-backed IPOs choose a distribution method (cash dividends) which shareholders expect to be stable in terms of level and consistency of payment in the long-term. This allows to disgorge cash and reflects PE investors' effective monitoring.

I find that non-backed IPOs exhibit significantly higher dividend yield (1.72%) than PE (1%) and VC (0.74%) samples. The latter group of firms wait six

[59] I compare the board's size and composition at fiscal year t and the IPO year.

years before making their first dividend payment, whereas PE and non-backed IPOs initiate a dividend after just two years. Only 3% of firms chose share repurchases as their payout initiation method. In these programs, firms sought to repurchase 9-14% of outstanding shares. Non-backed sample waits the longest to initiate a repurchase (6.22 years); whereas backed IPOs initiate repurchase within 4-5 years after the flotation.

Only 13 non-backed and 14 financially sponsored (of which 5 VC and 9 PE) firms in my sample paid a special dividend post-flotation[60] suggesting that the payment of special dividends to PE investors is not as widespread in the industry as it is claimed[61] (at least for companies which financial investors exit through an IPO). The PE sample makes the first special dividend payment significantly sooner (2-3 years) after the flotation than their peers, who wait for an average of four to five years.

One quarter of backed IPOs experience full exit by financial sponsors after the expiration of the lockup clause (Panel B). Financial sponsors who are responsible for bringing firms to the stock market are still listed as the firm's shareholders three years post-flotation in 53% (55%) of VC (PE) IPOs. Consistent with previous studies (Levis, 2011), PE investors hold significantly more concentrated equity ownership immediately pre and post-flotation: PE (VC) groups' pre-IPO ownership of 70.82% (51.50%) is reduced to 47.44% (39.44%) around the admission date. After the lockup expiration date, PE investors voluntary maintain 29.69% of the firm's shares, in

[60] Note that summary statistics of dividend and repurchase programs refer to the *first* payout conducted by firms post-flotation (i.e. payout initiations). In contrast, special dividends are paid after cash distribution initiations.

[61] For example, a recent *Financial Times* article claims that this practise is commonplace (Thomas, 2014): "The practice, where debt was raised on Phones 4U's balance sheet to pay out a special dividend, has been criticised for leaving businesses saddled with high debts and vulnerable to external market shocks, although it has become commonplace in the private equity world."

comparison to venture capitalists' average ownership of 21.61%. In the third year post-flotation, PE (VC) syndicate collectively holds 13.71% (7.76%) of equity.

Financial sponsors differ in their cross-border investment preference: only 19% of PE portfolio firms are located in another country than PE funds' headquarters. In contrast, almost one third of VC portfolio firms are located across the border from their venture capitalists' head office. Venture capitalists back IPOs in syndicates of four VC members, which is a method to reduce and share risk associated with backing young, risky, high-tech firms (Wright and Lockett, 2003). Moreover, financial sponsors significantly differ with respect to their ownership structure:[62] 15% of PE funds are bank-affiliated, in contrast to 7% of the VC sample.

[Insert Table 2]

Figure 1 and 2 portray the evolution of the average board size and proportion of independent directors.[63] The average VC IPOs' board size increased steadily from 7 members in 2000 to 8-9 members in 2005. PE boards have maintained the same board size of 8 members, which is significantly larger than boards of VC and non-backed samples throughout the examined period.[64]

The proportion of independent directors (Figure 2) has experienced a significant jump for backed and non-financially sponsored samples during the early 2000's, which captures the industry's move towards better corporate governance and emergence of the Sarbanes-Oxley Act following the Enron scandal. The average proportion of directors on PE (VC) boards has increased from 40% (50%) in 2000 to 60% (74%) in 2006. Overall, for most of the examined period, financially sponsored

[62] PE and VC funds operate under two organizational structures: captive and independent. The former could be divided into either corporate-, bank- or government-owned. In these cases, for example, a bank is the parent company of PE fund.
[63] Since the vast majority of BoardEx missing data is concentrated in 1997-1999 period, the figures start in 2000.
[64] Except for 2006 and 2008 when PE and VC samples' averages converged.

IPOs have maintained larger boards with higher proportion of independent directors than non-backed firms.

[Insert Figure 1 and 2]

Figure 3 and 4 report the evolution of the average board size and composition in the post-flotation period for backed and non-backed IPOs.[65] On average, non-sponsored IPOs are quoted with 7 members on the board, which increases by one member within the first year of flotation. The proportion of independent directors of 60% remains relatively stable in comparison to its initial (pre-IPO) level.

For financially sponsored IPOs, I distinguish between retained and exited companies. The proportion of independent directors is vital for corporate governance of public firms. At the time of flotation about 50%-71% of backed firms' boards are occupied by independent directors. For PE samples (exited and retained), this proportion increases monotonically throughout the years from 56% to 69% by the end of the fourth year after the admission. Within VC sample, retained companies simply maintain their high proportion of independent directors, suggesting that continued presence of financial sponsors post-flotation reinforces the firm's focus on corporate governance. It is important to note that equity retention by PE and VC investors does not act as a substitute for another monitoring mechanism (i.e. proportion of independent directors).[66] Overall, the evolution of board size of non-sponsored IPOs is similar to PE-IPOs, whereas its composition is closer to VC-IPOs.

[Insert Figure 3 and 4]

Table 3 Panel A reports statistics for the differences in means and medians between exited and retained firms. I find that retained PE IPOs maintain significantly larger boards than PE exited peers, while retained VC firms exhibit boards with

[65] I present the same information in the table format in Appendix 3.
[66] If it was the case, then I would have expected to find the proportion of independent directors to be significantly lower in retained sample than in exited one.

significantly higher proportion of independent directors than exited VC IPOs. This is in line with my expectation that due to fundamental IPO characteristics, PE (VC) sponsors need to reduce agency conflicts (information asymmetries) and hence continue to shape the company's board size (proportion of independent directors) in the post-flotation period.

Panel B reports differences-in-means between PE and VC IPOs. The results demonstrate financial sponsors' diverse monitoring styles of their retained portfolio firms. In line with earlier results, on average PE-backed companies have significantly larger boards and lower proportion of independent directors than VC-backed IPOs. However, in case financial sponsors conduct full exits, then both samples (exited PE and VC IPOs) converge to the same average board size and composition. Hence, PE and VC investors continue to exhibit different monitoring approaches in the post-IPO period.

[Insert Table 3]

Table 4 presents results of a logit regression, where I examine whether retained backed IPOs are more likely to preserve pre-IPO corporate policies than exited peers. The dependent variable equals one if the board size (Panel A) and composition (Panel B) in fiscal year t remains unchanged in comparison to IPO year's board features, and zero otherwise.

I find that firms with higher management ownership and those in high-tech industries are more likely to retain their initial board size (Model [1]). Hence, in firms with closer alignment of managers' and shareholders' interests, firms do not need to alter the board size. Within backed IPOs, the retention of the firm's shares by financial sponsors has a statistically significant positive effect on the likelihood of initial

board's size preservation (Model [3]). This finding provides support for my initial expectation, however this is solely driven by VC sample.

It is interesting to note that management ownership does not have a significant impact on non-backed IPO's board size, while a significant positive effect on financially sponsored' board size likelihood to remain unchanged (Model [3]-[5]). This could be explained by the fact that management equity ownership is used to align interests of managers and those of shareholders, thereby reducing the need to make any changes in the firm's strategic unit (i.e. the board of directors) in backed IPOs. Managers of backed IPOs are more incentivized to act in the best interest of shareholders and focus on value maximization as a result of the close monitoring conducted by financial sponsors and strategic vision imposed by PE/VC investors. Overall, my results confirm that financial sponsors with retained ownership prefer to maintain practises put by them in place in the pre-flotation period.

Similarly, management ownership has a positive effect of the probability of boards' initial composition retention in recently quoted firms (Panel B). Overall, the results suggest that management ownership is a strong interest alignment mechanism in backed IPOs, but not in non-sponsored firms. The results reveal that larger non-backed IPOs are more likely to retain their board's composition post-flotation (Model [2]). These firms could face smaller need to adjust the proportion of independent directors post-flotation partly because of their public profile, greater information availability and analyst coverage (Barry and Brown, 1984). I find that financial sponsors' equity retention does not have a significant effect on the likelihood of preserving initial proportion of independent directors.

[Insert Table 4]

Table 5 reports the results of the multivariate analyses of the board size and composition. I find that on average financially sponsored IPOs have significantly larger boards than non-backed peers even after controlling for various firm characteristics and industry effects (Panel A, Model [1]). This is in contrast to Acharya *et al* (2009), who report smaller PE backed firms' boards in comparison to (non-backed) peers. I believe this difference could be driven by the following four factors: i) their study is based on a sample of public firms, whereas this paper exclusively concentrates on *recently quoted* firms which recently have undergone a corporate event with significant corporate governance changes (Baker and Gompers, 2003). ii) our samples differ with respect to the market of quotation (UK versus US), participants of which rely on different set of rules and regulations of corporate governance. Firms in the UK are governed by the Listing Rules and the Combined Code on Corporate Governance, whereas companies located in the US rely on detailed regulations listed in the Sarbanes-Oxley Act of 2002. Although, both markets emphasize shareholders' interests, there are some significant differences between the two markets. For example, the dual role of CEO and Chairman of the board in the US is the norm, however it rarely takes place in the UK. iii) financial sponsors adopt different monitoring styles depending on the market of quotation. For example, Lasfer and Matanova (2013) report that investment, monitoring and divestment styles of financial sponsors' differ significantly in the US and UK. iv) their main quantitative analysis represents a snapshot of 2007, whereas I examine the post-flotation evolution of the board's features over the period between 1997 and 2012.

The results of Model [2] and [3] indicate that management ownership (firm's size) have a significant negative (positive) impact on the size of backed and non-financially boards. Hence, firms with higher managerial ownership have more

collaborative, smaller boards. While larger firms, with broader range of more complex operations, require a larger strategic unit (i.e. board of directors) to ensure expert coverage of all functional and geographic capabilities.

My analysis reveals different drivers of the board size in backed and non-sponsored firms (Model [2] and [3]). For example, leverage has a negative effect on non-backed firms' board size, while no significant effect on backed IPOs. Hence, contingencies and monitoring which come with leverage reduce non-backed IPOs' board size, thereby making it smaller, more effective and collaborative. Whereas, in backed IPOs leverage only acts as a method to incentivize managers to concentrate on cash management. R&D and firm age have positive (negative) impact on non-backed (financially sponsored) IPOs' board size. Moreover, capital expenditure has a negative (positive) relationship with non-backed (financially sponsored) IPOs' board size. Lastly, in contrast to backed IPOs, the board size of non-backed companies is not affected by firms' cash flows. Overall, the drivers of backed IPOs' board size are consistent with the scope of operations hypothesis proposed by Boone *et al* (2007) and monitoring hypotheses, whereas only the former explains drivers of non-backed IPOs' board size.

PE backed-IPOs have significantly larger boards of directors than VC peers (Model [3]). This finding, coupled with the significant retention coefficient in the PE sample only (Model [4] and [5]), provide support for my initial expectation that there is a higher need for the monitoring role of the board in PE-backed IPOs to reduce agency conflicts. The PE-backed firm's new status of a publicly listed company demands for an additional, specialized board member to efficiently oversee broad scope of operations, review managers' performance, provide sufficient leadership and specialized advise, and contribute to the success of larger and more complex

operations of mature firms. This is consistent with some arguments in the prior literature (Lehn *et al*, 2005; Coles *et al*, 2008) which propose that firms with more complex operations (Fama and Jensen, 1983) and those with expanding product lines or geographic scope need managers with specialized expertise.

My analysis of PE boards (Model [4]) reveals that PE firms with higher capital expenditures (cash flows) have larger (smaller) boards in order to ensure that the firm is not wasting cash. With respect to VC IPOs (Model [5]), younger and more profitable firms in terms of return on assets have significantly larger boards.

Panel B presents a multivariate analysis of the proportion of independent directors on the boards of recently quoted firms. As expected, backed IPOs have significantly higher proportion of independent directors post-flotation than non-sponsored IPOs (Model [1]). This finding confirms that the mere pre-IPO involvement of financial sponsors has a long-lasting effect on companies' governance and practices, which extends into the post-IPO period. Interestingly, Model [2] reveals that management ownership does not impact non-backed IPOs' board composition.

PE IPOs have significantly lower proportion of independent members on their boards than young, high-tech affiliated VC-backed firms (Model [3]), which is consistent with my expectation. Most importantly, I document that retained backed IPOs have significantly higher proportion of independent directors on their boards than exited peers. Hence, both types of financial sponsors re-enforce better corporate governance in their portfolio firms in the post-flotation period. From the financial sponsors' perspective, who retain ownership after the lockup expiration, it is advantageous to increase the proportion of independent directors because they would provide monitoring of managers' actions and ensure that they act in the best interest of shareholders. This also could be driven by the need to efficiently oversee firms'

operations when financial sponsors' ownership concentration is significantly reduced at the IPO date. Monitoring conducted by independent directors reduces the scope for moral hazard and information asymmetries, which translates into value maximization, or more importantly high share price at financial sponsors' full exit post-flotation. In addition, this demonstrates that financial sponsors are actively involved in shaping the firms' policies even after the quotation which is beneficial for the shareholders.

The negative relationship between management ownership and board composition prevails also in backed firms. The debt ratio acts as an additional monitoring mechanism, which reduces the need of having more independent directors on the backed firms' boards. PE firms with high capital expenditures (cash flow) have a lower (higher) proportion on independent directors. These firms specifically need independent directors, who would act as objective and completely independent monitoring agents post-flotation. Firms which have been operating for a longer period of time have lower proportion of independent directors, which is explained by the market's better familiarity with the firm. Overall, separate analysis of backed and non-sponsored IPOs reveals various drivers of the boards' compositions (i.e. proportion of independent directors) post-flotation.

In addition, I document that PE fund's bank-affiliation (Panel C) has significant positive association with board size of PE-backed IPOs. Hence, bank-affiliated PE funds demonstrate and impose a distinctive monitoring style, which involves having larger boards. As a robustness check, I use financial sponsors' voluntary ownership specified in decimals in each year post-flotation instead of the retention dummy. I find support that there is a positive relationship between PE investors' voluntary ownership and proportion of independent directors. The results are presented in the Appendix 4. In sum, my results in Table 5 provide support for

hypothesis 1, which suggests that voluntary ownership retention by financial sponsors have significant impact on the firm's post-IPO board size and composition.

[Insert Table 5]

Table 6 reports regression analyses of capital (Panel A) and acquisition (Panel B) expenditures for various samples. I find that backed IPOs spend significantly less on capital assets than non-sponsored IPOs post-flotation. Consistent with Opler *et al* (1999) firms with higher cash flows and cash levels exhibit higher capital expenditures post-flotation (Model [1]).

Within the financially sponsored firms, PE-backed IPOs spend significantly more on capital expenditures than VC IPOs (Model [2]). Contrary to my expectation, I find that ownership retention does not affect PE-backed IPOs' capex, while VC investors' retention has a statistically significant negative impact. Hence, financial sponsors consider vital to monitor expenditures in young firms with high growth opportunities, in order to minimize wasteful expenses.

Model [3] and [4] shed light on the drivers of PE-backed companies' capital expenditures: PE IPOs with higher leverage take a more conservative approach to spending, and their capex-to-total assets ratio is significantly lower. My results suggest that PE-backed IPOs face a trade-off between the R&D, payout to shareholders and capital expenditures: firms which spend more on R&D and those which initiate a cash payout exhibit significantly lower capital expenditures.

In addition, the results show that IPOs with low proximity to PE fund's headquarters have significantly lower capital expenditures. This is explained by the financial sponsors' constrained ability (i.e. geographically) to monitor managers' cash uses, and their preference to minimize cash related capital expenditures in order to avoid wasteful spending. Hence, PE investors continue to monitor portfolio firms'

expenditures in the post-flotation period. Consistent with the young, growing nature of VC portfolio firms, IPOs with higher sales growth invest more in physical assets in order to increase the scope of their operations in the future (Model [5] and [6]).

Panel B presents the multivariate analysis of firms' acquisition expenditures.[67] Interestingly, firms which indicate that their primary planned use of IPO proceeds is to finance acquisitions do not exhibit significantly higher (cash related) acquisition expenditures, which contributes to Celikyurt *et al* (2010).[68] On average, I find that backed IPOs spend significantly less cash on acquisitions post-flotation than non-sponsored peers.

PE-backed IPOs spend significantly more on acquisitions than VC peers (Model [2]). PE-backed firms' acquisition expenditures are positively (negatively) affected by cash flows, proportion of assets held in cash and sales growth (R&D). Most importantly, I report that retained VC-backed IPOs spend significantly less cash on acquisitions than exited VC peers. This could be driven by the optimized level of physical assets (set by financial sponsors while the company was under private ownership), financial sponsors' goal of minimizing wasteful investments, or different financing method used for acquisition purposes by retained IPOs.

Overall, venture capitalists with retained post-IPO ownership are more active in determining the firm's cash capital and acquisition expenditure levels, which is essential for young, growing companies to maintain or increase the scope of their operations in comparison to PE investors. This finding is consistent with Celikyurt *et al* (2014) and Krishnan *et al* (2011), who focus on the impact of VC holdings in

[67] It is important to note that I only concentrate on the *cash* outflows associated with acquisitions.
[68] However, one should bear in mind that the sample used in my study differs from the one in Celikyurt *et al* (2010) paper. Their sample consists of quotations which took place between 1985 and 2004. They also imposed a size cutoff to ensure a certain minimum size and reliable data on M&A activity (Celikyurt *et al*, 2010 p. 348).

mature firms and find that VC funds are active monitors and are well represented on the board of directors.

[Insert Table 6]

Table 7 reports the annual distribution of IPOs and payout initiations. In the post-flotation period, 16.24% of PE-backed IPOs have initiated some form of payout to shareholders, in contrast to only 3.86% of the VC-backed sample. This is due to the fact that PE-backed IPOs have significantly higher free cash flows, maturity and low growth opportunities, compared to VC peers. VC-backed IPOs' propensity to initiate a payout is lower than the one of non-backed IPOs: 9.7% of non-backed firms initiated a payout post-flotation, in line with Kale *et al* (2012) who report that 13.25% of companies, which were floated between 1979 and 2005, initiated dividends. The results in Table 7 suggest that PE-backed and non-backed IPOs are inclined to initiate distributions by means of dividends, whereas VC IPOs do not have a clear preferred payout method.

[Insert Table 7]

Figure 5 portrays the payout waves throughout the sample period and shows that 41.17% of all dividend initiations took place between 2005 and 2007. It is unlikely that these dividend initiations are driven by the catering theory because during these years the dividend premium was -11.87, -13.03 and -8.53, respectively.[69] The number of repurchases in my sample is more evenly spread across the years.

[Insert Figure 3]

Table 8 presents results of the logit model, where I model the likelihood of payout initiation in the post-IPO period by backed firms. In the second regression, I include NYSE dummy instead of PE dummy to overcome the multicollinearity

[69] This data is taken from the study by Baker and Wurgler (2004).

problem. This regression allows to test for hypothesis 3 and 4. The results of Model [1] suggest that the likelihood of payout initiation is similar for both types of financially sponsored firms (PE and VC). I do not find support for hypothesis 3, since the coefficient of the retention dummy is insignificant.

The retention of initial board's features has a significant impact on the payout initiation likelihood: firms which preserve their initial size (composition) are more (less) likely to initiate a payout post-flotation, which provides partial support for hypothesis 4. Hence, backed firms with constant proportion of independent directors prefer to refrain from dividend initiations, and rather invest in future growth. Overall, these findings provide support for hypothesis 4, which argues that alterations of the board of directors indicate that in the near future other corporate policies are likely to undergo a significant change. In addition, firms with higher capital expenditures (return on assets) are less (more) likely to initiate a cash distribution post-flotation. Hence, capital intensive firms prefer to invest in future growth, whereas more profitable firms choose to make distributions to shareholders. I find that as more time passes post-flotation, the less likely backed firms to initiate any form of payout, which is consistent with Kale *et al* (2012). This finding is also in line with Brav *et al* (2005) who find that the vast majority of CFO's of firms, which in the past three years have not paid dividends or repurchased shares, are not planning to do so in the future. Larger financially sponsored firms are more likely to initiate dividends or share repurchases.

[Insert Table 8]

Table 9 presents the results of a logit model, where the dependent variable equals one if the firm initiated cash dividends, and 0 if, instead, it bought back shares. Backed IPOs have a preference to initiate cash dividends, is in contrast to Jain *et al*

(2009) who report that IPOs have a preference towards share repurchases. The results of Model [1] suggest that high-tech IPOs prefer the more flexible share repurchase because their unstable cash flows make it more challenging to guarantee a stable flow of dividends in the long-term. Firms with higher sales growth and those which indicate a higher number of planned uses of IPO proceeds are more likely to choose dividends than share repurchases. The results of Model [1] reject my initial expectation, and suggest that financially sponsored IPOs represent a distinctive group of companies, which in contrast to non-backed IPOs, initiate and commit to paying a stream of ordinary dividends to shareholders in the long-run.

Model [2] includes only financially-sponsored IPOs which returned cash to their shareholders. My results suggest that, contrary to my initial expectation, ownership retention by financial sponsors does not influence backed IPOs' preferred payout initiation method. Backed IPOs, which are concentrated in high-tech industries and those with higher return on assets are less likely to choose cash dividends, whereas firms which indicated that their primary use of proceeds is 'general corporate' purpose are more likely to initiate a share repurchase.

[Insert Table 9]

Lastly, I examine whether in retained backed IPOs, financial sponsors continue to create value by shaping corporate policies (board composition, investment and payout policies). Results are presented in Table 10. On average, financially sponsored IPOs have higher firm value in the post-flotation period than non-backed peers (Panel A, Model [1]), whereas, within backed IPOs, PE IPOs exhibit lower firm value (Model [3]). Panel B provides separate analysis of PE- and VC-backed IPOs. Consistent with Yermack (1996), I find that the board size has a significant negative effect on PE firm’s value. Hence, larger board are indeed dysfunctional and less

efficient (Lipton and Lorsch, 1992) as a result of free riding, the relative complexity in financially sponsored IPOs and slower communication. I find that the proportion of independent directors, capital expenditures, return on assets, firm size and management ownership are positively associated with PE firm value. I find, in *voluntarily retained* PE-backed IPOs, the examined corporate policies do not create value and their capital expenditures destroy value. These findings suggest that PE investors are not able to create value in the post-flotation period by tuning certain corporate policies. It could be that PE investors have already set these policies at the optimal levels pre-flotation, and no more value is created by shaping these corporate policies after the initial public offering. Alternatively, the reduced PE investors' ownership at the IPO date and the emergence of other block holders deteriorate PE investors' ability to have a material impact on the examined policies.

In contrast, the continued involvement of VC investors in the post-flotation period is extremely beneficial for shareholders. The inverse relationship between firm value and board size reported by Yermack (1996) does not uniformly hold for all financially sponsored companies. I present evidence of a significant positive relationship between VC firm value and board size in *retained* VC-backed firms: the coefficient of the interaction variable (2.50) between board size and retention dummy is statistically significant at 1% level. My results contribute to studies such as Coles *et al* (2007), who report a positive relationship between board size and Tobin's Q of firms with extensive advising needs.

I find that the individual effect of the proportion of independent directors is negative, which could be explained by managers' insufficient familiarity with firms' operations and very specialized, high-tech nature of VC-backed firms. However, in retained VC firms, the board's composition has a significant positive effect. This

implies that venture capitalists ensure that the independent directors are informed about the IPO firm's business and their presence reduces information asymmetries, which leads to higher firm value. I find that without financial sponsors' monitoring and supervision VC-backed IPOs make wasteful capital expenditures. However, in retained VC IPOs capital expenditures contribute positively to firm value. Venture capitalists ensure that firms only spend and invest in value enhancing assets.

VC-backed firms which do not initiate a cash distribution to shareholders have higher firm value. However, I find that non-payout paying retained VC IPOs have lower value than non-payout paying exited peers. Hence, venture capitalists might withhold making cash distributions to shareholders for some private reasons, which is value destroying. Overall, the continued presence of VC funds in the post-flotation period is beneficial for young, risky, high-tech and growing firms, as they are able to create value by shaping certain corporate policies, although they may have an interior motive to withhold initiating a payout to shareholders.

[Insert Table 10]

3.5 Robustness Tests

The relationship between financial sponsors' post-IPO equity retention and the board of directors' variables (board size and proportion of independent directors) might be endogenous. For example, it is possible that financial sponsors who continue to hold the firm's shares post-quotation select firms with larger boards and those with higher proportion of independent directors *ex ante*. I control for this possible endogeneity by a two stage least squares analysis. In the first stage, I regress the PE and VC investors' retention decision, whereas in the second stage I use an instrumental variable (syndicate size) in the board of directors' analysis. There is little

reason to expect PE/VC syndicate size to be related to the firm's board size and proportion of independent directors. The results of the first stage regressions reported in Table 11, indicate that the chosen instrument has very strong explanatory power. The two-stage least-squares estimation (Model [2], [4], [6] and [8]) are in line with the previous findings, documenting that PE/VC post-IPO equity retention has a statistically strong positive effect on the board of directors' size and composition. I also use the same instrumental variable approach to check the robustness of the finding that equity retention has a statistically negative impact on VC-backed firms' capital and acquisition expenditures. The results presented in Table 12 are consistent with my findings.

3.6 Conclusion

Given the witnessed increased number of financially-backed IPOs, it is vital to fully understand financial sponsors' influence on corporate policies post-quotation. This paper provides a deeper understanding of policies influenced by two types of financial sponsors (PE and VC), which are defined by different degree of ownership concentration and intensity of monitoring.

Backed IPOs represent a unique group of companies to which financial sponsors not only provide capital, but also monitor, provide certification, restructure and create value. Past studies have demonstrated that the involvement and influence of financial sponsors (PE and VC firms) do not terminate at the IPO date, but expands to the post-IPO period as VC funds remain active investors and exert great influence on the firm's corporate governance (Krishnan *et al*, 2011) and PE sponsors retain a significant equity ownership and representation on the board of directors (Cao, 2011).

I investigate whether ownership retention by financial sponsors after the lockup expiration has a significant impact on firms' evolution of the board of directors, investment (capital and acquisition) and payout patterns post-flotation. I find support that PE (VC) investors' voluntary ownership retention has statistically significant positive impact on the board's size (proportion of independent directors) in the post-flotation period, suggesting that the monitoring function of the board of directors is more important for PE-backed IPOs than for VC-backed IPOs, which mainly need advice and contacts. This monitoring is also different in terms of style, as PE investors affiliated to a bank ensure that their portfolio firms have larger the board of directors, but also in substance as VC investors significantly reduce the firm's acquisition and capital expenditures to minimize wasteful investments in growing firms. Whereas PE-backed IPO firms exhibit significantly lower capital spending only when PE investors are geographically constrained in their ability to overview the soundness and efficiency of the firm's capital expenditures.

I examine the payout initiation likelihood and methods used by US IPOs floated between 1997 and 2010. I show that IPOs which changed the board's composition are more likely to initiate a cash distribution suggesting that payout initiations take place after major alterations to the board's composition. Hence, I document the sequence of corporate policies' changes in the post-flotation period. Moreover, larger, more profitable and low capital expenditure backed IPOs are more likely to initiate a cash distribution to shareholders. I report that financially sponsored are more likely to initiate a payout via an ordinary dividend than share repurchases, in contrast to Jain *et al* (2009) who report that recently quoted companies have a preference towards share repurchases. I document that the ownership retention by

financial sponsors does not have an impact on the preferred payout initiation method within financially sponsored IPOs.

VC funds create value by shaping the board size, proportion of independent directors and capital expenditures, while PE-backed IPOs undertake value destroying capital expenditures. Hence, it's beneficial for shareholders when VC investors commit to their portfolio firm after the initial public offering.

Overall, presented results provide support for the main paper's hypothesis that post-IPO firms' corporate policies are significantly affected by PE and VC investors' equity retention, which have long-lasting implications for IPO firm value. The results of this paper have several important implications. First, potential investors in backed IPOs should be aware of the great influence financial sponsors continue to exert in the post-IPO period despite having other block holders of the firm's shares. Second, the market should acknowledge that PE and VC investors are catalysts of good corporate governance, which create value in firms they retain ownership in the post-flotation period. Third, financial sponsors continue to optimize and shape the firm's corporate policies after the initial public offering, although only VC investors' continued involvement creates value.

Fourth, in situations when monitoring abilities of financial sponsors are constrained by distance, other block holders should become more involved in shaping the firm's policies. Fifth, there is no perfect, universal monitoring style. PE and VC funds, as any other types of investors, have their own distinctive monitoring styles. For example, bank-affiliated funds force their portfolio firms to have larger boards. Overall, this paper demonstrates the channels through which financial sponsors continue to exert influence and create value in financially sponsored retained firms.

There are several limitations which should be acknowledged. First, I concentre on only IPO which is one type of exit route available for financial sponsors. Second, in my analysis I consider only recently quoted firms, and some findings might not apply for very mature, public firms. Third, my sample consists of firms quoted on the US stock markets, which are different to European markets. I consider one type of pre-IPO shareholders (i.e. PE and VC investors) and analyze their post-IPO behaviour and monitoring styles. Lastly, sample may suffer from the survivorship bias, as it only contains successful companies in which PE/VC have invested and brought to the market rather than failed investments in firms that were not able to make it to the IPO stage. In the near future, I plan to extend this research by concentrating on other types of pre-IPO block holders.

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Tables for Empirical Study 2

Table 1. Descriptive Statistics: IPO Firm, Board of Directors and Spending Patterns.

This table presents descriptive statistics of IPO firm (Panel A), the board of directors (Panel B) and spending patterns characteristics (Panel C). Matched samples for PE and VC samples are created based on 2-digit SIC code and size (market value of firms at IPO). Firm-year observations are used to calculate means and medians for PE-, VC-backed and matched IPOs. The following fiscal years are used: pre-IPO year (t-1) to 2012. Variable definitions are provided in the Appendix. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	PE-Backed IPOs		**Matched Non-Backed IPOs for PE-Backed IPOs**		**VC-Backed IPOs**		**Matched Non-Backed IPOs for VC-Backed IPOs**		**Differences**					
	[1]		[2]		[3]		[4]			t-stats			MW	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	[1]-[2]	[3]-[4]	[1]-[3]	[1]-[2]	[3]-[4]	[1]-[3]
Panel A. IPO Firm Characteristics														
Assets	1320.12	605.74	808.02	272.43	344.34	110.57	431.04	135.30	12.47***	-2.92***	19.97***	[0.00]	[0.00]	[0.00]
Cash/TA	0.18	0.08	0.29	0.18	0.76	0.48	0.37	0.29	-4.72***	7.50***	-4.77***	[0.00]	[0.00]	[0.00]
CF/TA	0.07	0.07	-0.19	0.06	-0.18	-0.02	-0.19	0.03	7.65***	0.39	16.30***	[0.00]	[0.00]	[0.00]
ROA	0.14	0.13	-0.18	0.08	-0.15	-0.01	-0.33	0.05	4.90***	3.10***	22.89***	[0.00]	[0.00]	[0.00]
SALES GROWTH	94.95	39.21	78.94	23.69	60.27	9.48	31.94	10.26	0.86	2.04**	1.58	[0.00]	[0.97]	[0.00]
LEV	0.50	0.36	0.21	0.04	0.10	0.01	0.18	0.03	17.44***	-9.79***	29.42***	[0.00]	[0.00]	[0.00]
R&D/TA	0.02	0.00	0.15	0.00	0.24	0.11	0.22	0.03	-4.18***	0.89	-11.17***	[0.00]	[0.00]	[0.00]
M/B RATIO	3.70	2.09	2.82	2.05	3.41	2.80	3.05	2.13	0.30	0.44	0.10	[0.44]	[0.00]	[0.00]
UNDER. REPUTATION	8.48	9.00	7.96	9.00	8.16	9.00	7.80	8.00	12.65***	9.83***	10.11***	[0.00]	[0.00]	[0.00]
FIRM AGE	28.58	18.00	23.47	12.00	6.63	5.00	18.31	11.00	3.94***	-6.72***	20.05***	[0.00]	[0.00]	[0.00]
NO. Of PROCEED USES	3.06	3.00	2.07	1.00	3.06	3.00	1.97	1.00	18.17***	23.48***	0.11	[0.00]	[0.00]	[0.03]
HIGH-TECH DUMMY	0.20		0.22		0.46		0.38		-2.13**	7.55***	-23.09***	[0.03]	[0.00]	[0.00]

	PE-Backed IPOs [1]		Matched Non-Backed IPOs for PE-Backed [2]		VC-Backed IPOs [3]		Matched Non-Backed IPOs for VC-Backed [4]		Differences t-stats			MW		
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	[1]-[2]	[3]-[4]	[1]-[3]	[1]-[2]	[3]-[4]	[1]-[3]
Panel B. The Board of Directors Characteristics														
Board Size	8.84	9.00	8.07	8.00	8.29	8.00	8.09	8.00	8.14***	2.51***	6.30***	[0.00]	[0.00]	[0.00]
Board Composition	0.63	0.67	0.60	0.60	0.69	0.71	0.62	0.63	3.10***	10.16***	-8.73***	[0.00]	[0.00]	[0.00]
Time in the organization: Executive Directors (t_0)	4.16	2.90	3.97	0.90	4.07	3.50	2.68	0.80	0.30	3.40***	0.24	[0.00]	[0.00]	[0.56]
Time on the board: Executive Directors (t_0)	3.13	2.20	2.51	0.80	3.66	2.90	1.93	0.80	1.40	5.25***	-1.74*	[0.00]	[0.00]	[0.09]
Time in the organization: Supervisory Directors (t_0)	2.08	1.80	1.12	0.60	2.31	2.20	1.26	0.50	4.99***	5.59***	-1.42	[0.00]	[0.00]	[0.19]
Time on the board: Supervisory Directors (t_0)	2.03	1.80	1.10	0.60	2.29	2.10	1.26	0.50	4.93***	5.50***	-1.57	[0.00]	[0.00]	[0.22]
Proportion of Firms: Board Size Alteration post-IPO	0.89		0.85		0.88		0.85		1.08	1.12	0.10	[0.28]	[0.26]	[0.91]
Proportion of Firms: Board Composition Alteration post-IPO	0.90		0.83		0.92		0.85		1.96**	2.26**	-0.66	[0.05]	[0.02]	[0.50]
Time to first post-IPO board size change	1.82	1.00	1.83	2.00	1.80	1.00	1.67	1.00	-0.06	1.02	0.16	[0.69]	[0.25]	[0.80]
Time to first post-IPO board composition change	1.75	1.00	1.89	2.00	1.78	1.00	1.65	1.00	-1.27	1.11	-0.38	[0.20]	[0.27]	[0.93]
Panel C. Spending Patterns Characteristics														
Proportion of Firms: Primary Use of Proceeds is Acqusitions	0.05		0.07		0.03		0.02		-1.00	0.77	1.55	[0.31]	[0.44]	[0.12]
CAPEX/TA	0.10	0.04	0.07	0.03	0.11	0.03	0.08	0.03	2.42***	2.10**	-0.27	[0.00]	[0.03]	[0.00]
ACQ/TA	0.05	0.00	0.05	0.00	0.05	0.00	0.03	0.00	0.41	2.15**	-0.36	[0.02]	[0.00]	[0.00]

Table 2. Descriptive Statistics: Payout Initiation and Financial Sponsors. This table presents descriptive statistics of payout initiations (Panel A) and financial sponsors' characteristics (Panel B). Firm-year observations are used to calculate means and medians for non-backed, PE- and VC-backed IPOs. The following fiscal years are used: pre-IPO year (t-1) to 2012. Variable definitions are provided in the Appendix. ' ¨ ' indicates that it is not applicable for the non-backed sample. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Non-Backed IPOs [1]		**PE-Backed IPOs** [2]		**VC-Backed IPOs** [3]		**Differences** t-stats			MW		
	Mean	Median	Mean	Median	Mean	Median	[1]-[2]	[1]-[3]	[2]-[3]	[1]-[2]	[1]-[3]	[2]-[3]
Panel A. Payout Initiation Characteristics												
Cash Dividend:												
Proportion of Firms: Dividend Initiations	0.07		0.13		0.02		-2.99***	4.10***	7.27***			
Dividend Cash Amount	0.21	0.17	0.14	0.10	0.41	0.05	1.70*	-1.22	-1.99**	[0.07]	[0.08]	[0.46]
Dividend Yield	1.72	1.16	1.00	0.71	0.74	0.32	4.46***	2.86***	2.11**	[0.00]	[0.00]	[0.00]
No. of years to Dividend Initiation	2.37	0.36	2.26	0.52	5.94	6.30	0.14	-3.03***	-3.74***	[0.51]	[0.00]	[0.00]
Repurchases:												
Proportion of Firms: Repurchase Initiations	0.03		0.03		0.02		-0.52	1.03	1.53			
Value of Transaction ($mil)	360.26	34.96	126.40	80.00	44.27	10.00	0.81	1.00	1.88*	[0.08]	[0.29]	[0.01]
% sought	14.08	10.60	9.67	9.70	14.40	9.50	0.88	-0.05	-1.02	[0.92]	[0.96]	[0.65]
No. of years to Repurchase Initiation	6.22	6.97	4.05	2.38	5.04	4.31	1.57	0.82	-0.77	[0.12]	[0.41]	[0.31]
Special Dividend:												
Proportion of Firms: Special Dividend	0.018		0.013		0.013		0.55	0.70	0.04			
Special Dividend Cash Amount	0.85	1.00	3.59	2.50	1.68	1.25	-2.87***	-1.50	1.72*	[0.03]	[0.17]	[0.16]
No. of years to Special Dividend	4.97	5.39	2.67	2.65	5.89	5.92	1.28	-0.55	-2.21**	[0.32]	[0.27]	[0.02]
Panel B. Financial Sponsors' Characteristics												
RETENTION DUMMY (unlock day)	¨	¨	0.76		0.78		¨	¨	-0.71	¨	¨	[0.48]
RETENTION DUMMY (12th quarter post-IPO)	¨	¨	0.55		0.53		¨	¨	0.51	¨	¨	[0.61]
Financial Sponsors' (PE/VC) $ownership_{pre\text{-}IPO}$	¨	¨	0.7082	0.7872	0.5150	0.5180	¨	¨	12.19***	¨	¨	[0.00]
Financial Sponsors' (PE/VC) $ownership_{post\text{-}IPO}$	¨	¨	0.4744	0.5030	0.3944	0.4020	¨	¨	6.47***	¨	¨	[0.00]
Financial Sponsors' (PE/VC) $ownership_{after\ unlock\ da}$	¨	¨	0.2969	0.0043	0.2161	0.0028	¨	¨	3.67***	¨	¨	[0.01]
Financial Sponsors' (PE/VC) $ownership_{t+1}$	¨	¨	0.2790	0.2550	0.1863	0.1592	¨	¨	7.91***	¨	¨	[0.00]
Financial Sponsors' (PE/VC) $ownership_{t+2}$	¨	¨	0.2136	0.1429	0.1361	0.0823	¨	¨	7.07***	¨	¨	[0.00]
Financial Sponsors' (PE/VC) $ownership_{t+3}$	¨	¨	0.1371	0.0043	0.0776	0.0025	¨	¨	6.50***	¨	¨	[0.00]
SYNDICATE SIZE	¨	¨	2.25	2.00	3.90	4.00	¨	¨	-12.25***	¨	¨	[0.00]
LOW PROXIMITY DUMMY	¨	¨	0.19		0.30		¨	¨	-2.75***	¨	¨	[0.01]
BANK AFF. DUMMY	¨	¨	0.15		0.07		¨	¨	2.76***	¨	¨	[0.01]

Table 3. The Board of Directors Evolution Post-Flotation.

The following table provides difference-in-means and medians for exited and retained backed samples (Panel A), and PE and VC sample (Panel B). '[E-R]' refers to the difference-in-means and medians between exited and retained samples (t-statistics and MW column values). '[PE-VC]' refers to the difference-in-means and medians between exited and retained samples (t-statistics and MW column values). t_o corresponds to the IPO year. Board size and board composition definitions are provided in the Appendix. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Panel A. Difference-in-means and medians between Exited and Retained Backed IPOs [E-R]				**Panel B.** Differences-in-means and medians between PE and VC Samples [PE-VC]			
	PE-Backed IPOs		**VC Backed IPOs**		**Exited**		**Retained**	
	t-stats	[MW]	t-stats	[MW]	t-stats	[MW]	t-stats	[MW]
				Board Size				
t_0	-1.42	[0.18]	-1.41	[0.20]	0.31	[0.89]	0.73	[0.46]
t_1	-2.76***	[0.00]	-2.16**	[0.04]	0.87	[0.49]	0.87	[0.00]
t_2	-2.25**	[0.08]	-0.76	[0.38]	0.91	[0.21]	4.49***	[0.00]
t_3	-2.16**	[0.04]	-1.13	[0.14]	0.76	[0.30]	3.72***	[0.00]
t_4	-1.87*	[0.12]	0.41	[0.97]	0.53	[0.47]	5.29***	[0.00]
				Board Composition				
t_0	0.32	[0.58]	-6.61***	[0.00]	1.03	[0.12]	-8.20***	[0.00]
t_1	-0.76	[0.81]	-5.49***	[0.00]	-0.06	[0.46]	-7.02***	[0.00]
t_2	-1.39	[0.31]	-5.09***	[0.00]	0.06	[0.45]	-5.04***	[0.00]
t_3	-1.38	[0.15]	-3.31***	[0.00]	0.02	[0.67]	-2.63***	[0.01]
t_4	-0.76	[0.33]	-2.84***	[0.00]	0.47	[0.41]	-1.81*	[0.19]

Table 4. The Likelihood of the Initial Board's Size and Composition Retention Post-Flotation.

Panel A (*B*) presents the results of a logit model, where the dependent variable equals one if the board size (composition) at fiscal year t is the same as the board size at IPO year (t_0), and zero otherwise. Variable definitions are provided in the Appendix. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. The Likelihood of the Board's Size to Remain Unchanged										
	All IPOs		**Non-Backed IPOs**		**Backed IPOs**		**PE-Backed IPOs**		**VC-Backed IPOs**	
	coef.	[p-value]	coef.	[p-value]	coef.	[p-value]	coef.	[p-value]	coef.	[p-value]
	[1]		[2]		[3]		[4]		[5]	
INTERCEPT	-1.57***	[0.000]	-1.36*	[0.080]	-2.40***	[0.000]	-1.85**	[0.023]	-3.34***	[0.001]
PE DUMMY					0.06	[0.786]				
RETENTION DUMMY					0.54**	[0.049]	0.31	[0.344]	1.12**	[0.048]
MGT OWN	0.81*	[0.061]	0.02	[0.979]	2.15***	[0.001]	3.88***	[0.002]	1.46*	[0.080]
LEV	0.03	[0.897]	1.06	[0.143]	-0.01	[0.964]	-0.21	[0.554]	0.42	[0.357]
LOG (MV)	0.12	[0.346]	0.03	[0.912]	0.15	[0.367]	0.08	[0.723]	0.25	[0.288]
ROA	-0.37	[0.408]	-2.81	[0.242]	-0.26	[0.581]	-1.10	[0.436]	0.05	[0.917]
R&D/TA	0.19	[0.273]	-0.23	[0.860]	0.11	[0.549]	-0.60	[0.897]	-0.08	[0.757]
CAPEX/TA	-0.21	[0.135]	-1.21	[0.471]	-0.15	[0.275]	-0.29	[0.646]	-0.02	[0.891]
CF/TA	0.34	[0.429]	3.42	[0.155]	-0.04	[0.933]	0.86	[0.530]	-0.50	[0.394]
FIRM AGE	0.10	[0.550]	0.40	[0.262]	0.16	[0.471]	0.10	[0.701]	0.33	[0.431]
HIGH-TECH DUMMY	0.49***	[0.001]	0.50	[0.156]	0.55***	[0.001]	0.55	[0.195]	0.55***	[0.009]
BACKED DUMMY	-0.05	[0.793]								
No. Of Obs.	1163		232		931		420		511	
Adj. R^2	1.63%		3.11%		2.82%		4.26%		2.71%	

Panel B. The Likelihood of the Board's Composition to Remain Unchanged										
	All IPOs		Non-Backed IPOs		Backed IPOs		PE-Backed IPOs		VC-Backed IPOs	
	coef.	[p-value]	coef.	[p-value]	coef.	[p-value]	coef.	[p-value]	coef.	[p-value]
	[1]		[2]		[3]		[4]		[5]	
INTERCEPT	-1.51***	[0.000]	-2.04***	[0.003]	-1.47***	[0.002]	-1.21*	[0.070]	-1.60**	[0.046]
PE DUMMY					0.16	[0.402]				
RETENTION DUMMY					-0.16	[0.398]	-0.34	[0.145]	0.22	[0.541]
MGT OWN	1.07***	[0.004]	0.17	[0.744]	2.44***	[0.000]	2.79*	[0.007]	2.48***	[0.001]
LEV	-0.06	[0.625]	-0.19	[0.627]	0.08	[0.711]	0.04	[0.881]	0.54	[0.287]
LOG (MV)	0.18	[0.108]	0.66**	[0.005]	0.02	[0.869]	0.04	[0.830]	0.05	[0.818]
ROA	-0.46	[0.114]	-0.39	[0.781]	-0.47	[0.235]	-0.33	[0.754]	-0.47	[0.291]
R&D/TA	0.18	[0.104]	0.17	[0.693]	0.36*	[0.061]	-0.50	[0.883]	0.17	[0.512]
CAPEX/TA	-0.06	[0.434]	-0.71	[0.617]	-0.06	[0.448]	-1.22	[0.323]	0.07	[0.645]
CF/TA	0.44	[0.119]	0.71	[0.617]	0.35	[0.390]	-0.64	[0.437]	0.37	[0.472]
FIRM AGE	0.19	[0.201]	-0.22	[0.454]	0.28	[0.135]	0.34	[0.121]	0.05	[0.916]
HIGH-TECH DUMMY	-0.01	[0.950]	0.21	[0.486]	0.02	[0.879]	0.27	[0.418]	-0.17	[0.382]
BACKED DUMMY	-0.15	[0.372]								
No. Of Obs.	1437		283		1154		552		602	
Adj. R^2	1.22%		4.27%		2.18%		2.76%		2.98%	

Table 5. Multivariate Analysis of Board Size and Composition.

This table presents results of OLS regressions, where the dependent variable is equal to the number of directors on the board (Panel A), and proportion of independent directors on the board specified in decimals (Panel B). Post-IPO years are used for these regressions. In Panel C, an additional independent variable is added to the regressions (bank-affiliation dummy). In Panel C, the dependent variable is the board size (Model [1] and [2]) and proportion of independent directors (Model [3] and [4]). Variable definitions are provided in the Appendix. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Board Size										
	All IPOs		**Non-Backed IPOs**		**Backed IPOs**		**PE-Backed IPOs**		**VC-Backed IPOs**	
	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat
	[1]		[2]		[3]		[4]		[5]	
INTERCEPT	5.79***	[2.72]	5.19***	[6.11]	6.41***	[3.03]	6.66***	[8.76]	7.71***	[3.98]
PE DUMMY					0.60***	[4.07]				
RETENTION DUMMY					0.44***	[2.93]	0.50**	[2.45]	0.33	[1.40]
MGT OWN	-1.37***	[-4.89]	-0.92**	[-2.00]	-1.59***	[-4.50]	-1.38**	[-2.51]	-1.41***	[-3.13]
LEV	-0.02	[-0.17]	-0.45***	[-2.86]	-0.11	[-0.78]	-0.05	[-0.30]	-0.15	[-0.46]
LOG $(MV)_t$	0.45***	[4.80]	0.44**	[2.21]	0.45***	[4.18]	0.82***	[4.46]	0.25*	[1.85]
ROA	0.29	[1.26]	-0.21	[-0.41]	0.51*	[1.77]	-1.22	[-1.33]	0.88***	[3.02]
R&D/TA	-0.06	[-0.72]	0.81***	[3.16]	-0.16*	[-1.66]	-2.07	[-0.77]	0.04	[0.24]
CAPEX/TA	0.12***	[2.39]	-1.18***	[-2.68]	0.18***	[3.49]	0.19***	[2.98]	0.05	[0.43]
CF/TA	-0.73***	[-3.38]	0.04	[0.09]	-1.33***	[-4.63]	-1.66**	[-1.98]	-1.29***	[-4.07]
FIRM AGE	0.21*	[1.72]	0.97***	[3.77]	-0.27*	[-1.75]	-0.22	[-1.12]	-0.51*	[-1.82]
BACKED DUMMY	0.30**	[2.22]								
INDUSTRY DUMMIES	YES		YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES		YES	
No. Of Obs.	2044		345		1702		803		899	
Adj. R^2	6.49%		11.54%		7.89%		6.72%		13.36%	

Panel B. Proportion of Independent Directors										
	All IPOs		**Non-Backed IPOs**		**Backed IPOs**		**PE-Backed IPOs**		**VC-Backed IPOs**	
	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat
	[1]		[2]		[3]		[4]		[5]	
INTERCEPT	0.56***	[3.39]	0.58***	[8.73]	0.64***	[4.03]	0.51***	[8.33]	0.57***	[4.35]
PE DUMMY					-0.08***	[-7.34]				
RETENTION DUMMY					0.06***	[5.35]	0.06***	[3.73]	0.06***	[3.83]
MGT OWN	-0.06***	[-2.84]	-0.02	[-0.64]	-0.09***	[-3.60]	-0.02	[-0.46]	-0.15***	[-4.94]
LEV	-0.04***	[-6.31]	-0.03**	[-2.01]	-0.03***	[-2.46]	-0.03**	[-2.02]	-0.05**	[-2.02]
LOG $(MV)_t$	0.00	[0.59]	0.02	[1.37]	0.00	[0.57]	-0.02	[-1.18]	0.03***	[2.98]
ROA	-0.06***	[-3.19]	-0.02	[-0.39]	-0.04**	[-1.98]	-0.07	[-0.99]	-0.01	[-0.74]
R&D/TA	0.03***	[5.28]	0.06***	[2.91]	0.02**	[2.13]	0.16	[0.74]	-0.01	[-0.53]
CAPEX/TA	-0.02***	[-4.97]	-0.07**	[-2.05]	-0.02***	[-4.17]	-0.02***	[-3.56]	-0.01	[-0.28]
CF/TA	0.06***	[3.81]	0.01	[0.44]	0.08***	[3.82]	0.17***	[2.48]	0.03	[1.51]
FIRM AGE	-0.05***	[-5.17]	0.02	[1.00]	-0.04***	[-3.35]	-0.05***	[-3.12]	-0.01	[-0.66]
BACKED DUMMY	0.05***	[5.11]								
INDUSTRY DUMMIES	YES		YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES		YES	
No. Of Obs.	2044		345		1702		803		899	
Adj. R^2	22.21%		19.69%		27.49%		13.50%		37.63%	

Panel C.	**Board Size**				**Proportion of Independent Directors**			
	PE-Backed IPOs		VC-Backed IPOs		PE-Backed IPOs		VC-Backed IPOs	
	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat
	[1]		[2]		[3]		[4]	
INTERCEPT	5.98***	[4.92]	7.58***	[3.81]	0.69***	[7.37]	0.62***	[4.91]
RETENTION DUMMY	0.46	[0.89]	0.77**	[2.45]	0.05	[1.20]	0.06***	[2.86]
MGT OWN	-1.80**	[-2.29]	-1.29**	[-2.25]	-0.07	[-1.18]	-0.21***	[-5.83]
LEV	-0.13	[-0.55]	0.05	[0.11]	-0.03	[-1.62]	-0.03	[-1.02]
LOG $(MV)_t$	0.97***	[3.58]	0.23	[1.48]	-0.03	[-1.58]	0.02**	[2.24]
ROA	-2.43*	[-1.75]	0.73**	[2.24]	-0.09	[-0.83]	-0.02	[-0.97]
R&D/TA	-9.19**	[-2.25]	-0.14	[-0.44]	-0.14	[-0.45]	-0.03	[-1.37]
CAPEX/TA	0.17**	[2.45]	-0.09	[-0.64]	-0.02***	[-3.44]	0.00	[-0.52]
CF/TA	-0.60	[-0.49]	-1.09***	[-3.03]	0.17*	[1.84]	0.03	[1.35]
FIRM AGE	-0.33	[-1.11]	-0.36	[-1.10]	-0.04*	[-1.73]	-0.01	[-0.41]
BANK AFF. DUMMY	0.67*	[1.95]	-0.31	[-1.12]	0.03	[1.23]	0.01	[0.42]
INDUSTRY DUMMIES	YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES	
No. Of Obs.	431		646		431		646	
Adj. R^2	10.76%		11.55%		9.75%		34.80%	

Table 6. Multivariate Analysis of Capital and Acquisition Expenditures.

Panel A presents results of OLS regressions, where the dependent variable is equal to capital expenditures scaled by total assets at fiscal year t. *Panel B* presents results of OLS regressions, where the dependent variable is equal to acquisition expenditures scaled by total assets at fiscal year t. Variable definitions are provided in the Appendix. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Capital Expenditures												
	All IPOs		**Backed IPOs**		**PE-Backed IPOs**				**VC-Backed IPOs**			
	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat
	[1]		[2]		[3]		[4]		[5]		[6]	
INTERCEPT	0.58	[0.77]	0.01	[0.15]	-0.12	[-0.54]	0.24	[0.71]	0.03	[0.21]	0.00	[0.03]
BACKED DUMMY	-0.04**	[-2.27]										
PE DUMMY			0.08***	[3.95]								
RETENTION DUMMY			-0.02	[-1.20]	0.02	[0.60]	-0.32	[-1.51]	-0.07***	[-3.24]	-0.05***	[-5.18]
BANK. AFF. DUMMY							0.08	[1.11]			0.00	[-0.11]
LOW PROXIMITY DUMMY							-0.26***	[-3.80]			-0.01	[-0.70]
CF/TA	0.04***	[4.84]	0.07***	[4.86]	0.08	[0.88]	0.19	[1.48]	0.06***	[5.41]	-0.02**	[-2.45]
M/B RATIO	0.00	[-0.28]	0.00	[-0.19]	0.00	[0.24]	0.00	[0.27]	0.00	[-0.42]	0.00	[-1.21]
CASH/TA	0.09***	[34.89]	0.09***	[29.57]	1.15***	[23.21]	3.77***	[38.83]	0.08***	[33.10]	0.11***	[54.11]
SALES GROWTH	0.00	[-0.87]	0.01	[1.61]	0.02	[0.49]	-0.02	[-0.41]	0.01*	[1.77]	0.02***	[5.80]
LEV	0.01	[1.12]	-0.03**	[-2.27]	-0.06***	[-2.75]	-0.12***	[-3.65]	-0.10***	[-4.19]	-0.03**	[-2.05]
R&D/TA	0.10***	[5.04]	0.07***	[2.85]	-0.87***	[-2.57]	-3.57***	[-5.87]	0.13***	[6.21]	-0.06***	[-5.02]
NO PAYOUT DUMMY	-0.01	[-0.50]	0.05*	[1.81]	0.09**	[2.49]	0.06	[0.99]	0.02	[0.62]	0.03*	[1.91]
INDUSTRY DUMMIES	YES		YES		YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES		YES		YES	
No of Obs	9472		6379		2457		1123		3922		1927	
Adj R^2	39.64%		54.14%		18.15%		57.73%		74.15%		83.75%	

Panel B. Acquisition Expenditures												
	All IPOs		**Backed IPOs**		**PE-Backed IPOs**				**VC-Backed IPOs**			
	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat
	[1]		[2]		[3]		[4]		[5]		[6]	
INTERCEPT	0.04	[0.73]	-0.02	[-0.14]	0.00	[-0.00]	-0.12	[-0.85]	0.01	[0.01]	-0.01	[-0.08]
BACKED DUMMY		[-2.17]										
PE DUMMY			0.08***	[4.32]								
RETENTION DUMMY			-0.08***	[-4.24]	0.01	[0.43]	0.06	[0.61]	-0.14***	[-4.64]	-0.16***	[-3.29]
BANK. AFF. DUMMY							0.01	[0.31]			-0.01	[-0.16]
LOW PROXIMITY DUMMY							-0.01	[-0.40]			-0.01	[-0.00]
CF/TA	0.08***	[9.28]	0.08***	[6.04]	0.18***	[4.41]	0.24***	[3.40]	0.07***	[4.48]	-0.10**	[-2.29]
M/B RATIO	-0.01	[-0.07]	0.01	[0.26]	-0.01	[-0.14]	0.01	[0.12]	0.01	[0.85]	0.01	[0.20]
CASH/TA	0.01	[1.35]	-0.05***	[-8.43]	0.05**	[2.55]	0.02	[0.42]	-0.03***	[-7.22]	0.16***	[14.61]
SALES GROWTH	0.01	[0.05]	0.01	[1.63]	0.13***	[9.36]	0.19***	[8.81]	0.01	[1.14]	-0.07***	[-4.43]
LEV	0.06***	[4.27]	0.01	[0.12]	0.01	[0.78]	-0.01	[-0.35]	0.02	[0.54]	-0.06	[-0.79]
R&D/TA	0.42***	[20.99]	0.65***	[26.36]	0.14	[1.04]	-0.58*	[-1.91]	0.66***	[21.79]	-0.13**	[-2.10]
NO PAYOUT DUMMY	-0.04*	[-1.94]	-0.01	[-0.13]	0.01	[0.94]	0.01	[0.36]	-0.01	[-0.09]	0.05	[0.65]
PRIM. USE. ACQ	0.01	[0.30]	0.02	[0.56]	0.01	[0.28]	0.04	[0.71]	0.05	[0.64]	-0.01	[-0.06]
INDUSTRY DUMMIES	YES		YES		YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES		YES		YES	
No of Obs	8310		6123		2360		1091		3763		1857	
Adj R^2	21.65%		30.40%		6.41%		7.63%		32.60%		27.75%	

Table 7. The Annual Distribution of IPOs and post-IPO Payout Initiations.
No. of IPOs presents the total number of firms, which have been floated on the US stock markets at fiscal year t. No. of DIs is the total number of dividend initiations (DIs) in fiscal year t. No. of RIs is the total number of share repurchases (RIs) in fiscal year t.

Year	PE-Backed IPOs			VC-Backed IPOs			Non-Backed IPOs		
	No. of IPOs	No. of DIs	No. of RIs	No. of IPOs	No. of DIs	No. of RIs	No. of IPOs	No. of DIs	No. of RIs
1997	21	0	1	73	0	0	94	2	1
1998	24	0	1	47	0	0	43	0	2
1999	27	1	1	149	1	1	73	1	0
2000	25	2	1	124	0	1	53	1	0
2001	17	1	0	18	1	3	8	0	0
2002	20	1	0	11	0	2	5	0	1
2003	20	4	0	16	1	1	7	2	0
2004	41	5	2	51	1	1	28	3	2
2005	51	8	1	35	1	0	25	6	1
2006	59	7	1	45	1	0	23	5	3
2007	28	9	1	62	1	0	43	4	2
2008	4	3	0	8	2	2	9	2	0
2009	14	0	1	12	2	0	10	1	0
2010	30	4	2	48	3	0	31	2	0
2011	0	5	0	0	2	0	53	7	1
Total:	381	50	12	699	16	11	505	36	13

Table 8. The Likelihood of a Payout Initiation.

The following table presents the results of a logit model. The dependent variable (P) equals one if the firm has initiation a payout (dividend or share repurchase) at fiscal year t, and 0 otherwise. I construct the dependent variable in this manner: following Kale *et al* (2012) methodology, out of 188 IPOs in 1997, 4 firms (which initiated some form of payout) are assigned P=1, while the remaining 184 are assigned P=0. Out of remaining 34, I assign P=1 to firms which initiate a payout in 1998, and P=0 to the rest. This process is repeated until the end of the examination period. I follow Kale *et al* (2012) methodology for this test because it minimizes survivorship since I stop tracking the IPO once it initiates some form of payout. The sample used in this analysis is all firms which have conducted an IPO on the US stock markets between 1997 and 2010. Variable definitions are provided in the Appendix. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Backed IPOs			
	coef.	[p-value]	coef.	[p-value]
	[1]		[2]	
INTERCEPT	-6.93**	[0.016]	-6.64**	[0.027]
PE DUMMY	0.62	[0.443]		
NYSE DUMMY			0.16	[0.815]
RETENTION DUMMY	0.74	[0.442]	0.80	[0.417]
NO BOARD SIZE CHANGE$_{t \text{ vs. ipo } t}$	3.26***	[0.003]	3.23***	[0.004]
NO BOARD COMPOS. CHANGE$_{t \text{ vs. ipo } t}$	-2.80**	[0.034]	-2.78**	[0.032]
M/B	-0.01	[0.424]	-0.01	[0.433]
CAPEX/TA	-32.31**	[0.003]	-32.81***	[0.003]
R&D/TA	-10.38	[0.309]	-11.52	[0.257]
LEV	0.49	[0.523]	0.68	[0.345]
ROA	4.02***	[0.000]	3.94***	[0.001]
FDR	0.04	[0.930]	0.03	[0.933]
INSIDER OWN RETENTION	1.75	[0.246]	1.75	[0.268]
UNDER. REP	-0.14	[0.552]	-0.14	[0.553]
1+(FISCAL YR-IPO YR)	-1.34**	[0.015]	-1.31**	[0.014]
DIV PREMIUM	0.02	[0.713]	0.01	[0.806]
RET. EARNINGS/TA	-0.60	[0.220]	-0.54	[0.472]
LOG(TA)	1.89**	[0.002]	1.88**	[0.006]
CASH/TA	-0.01	[0.953]	-0.02	[0.881]
No. Of Obs.	962		965	
Pseudo R^2	43.15%		42.88%	

Table 9. Analysis of Payout Initiation Mechanism.

The following table presents the results of a logit model, where the dependent variable equals 1 if the firm has initiated a payout via dividends, and zero if by share repurchase. The sample used for this analysis consists of 138 firms, which has initiated either a dividend or share repurchase post-flotation. Each firm is tracked from IPO year for three years or the end of 2012, whichever is earlier. Variable definitions are provided in the Appendix. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	All Payout Initiated IPOs		**Payout Initiated Backed-IPOs**	
	coef.	[p-value]	coef.	[p-value]
	[1]		[2]	
INTERCEPT	-6.78	[0.237]	0.12	[0.992]
BACKED DUMMY	1.26*	[0.063]		
PE DUMMY			1.34	[0.298]
RETENTION DUMMY			-0.65	[0.465]
HIGH-TECH	-1.61*	[0.095]	-5.33**	[0.031]
NO. Of PROCEEDS	0.35*	[0.083]	0.29	[0.260]
PRIM. USE. REF	-0.17	[0.907]	0.49	[0.775]
PRIM. USE. GEN	0.89	[0.161]	2.44**	[0.018]
CAPEX/TA	3.46	[0.235]	-6.27	[0.161]
R&D/TA	-5.38	[0.530]	17.95	[0.174]
DIV PREMIUM	0.00	[0.993]	0.03	[0.624]
LEV	0.80	[0.373]	0.87	[0.528]
ROA	-3.53	[0.344]	-7.41*	[0.097]
FIRM AGE	-0.49	[0.383]	-0.40	[0.664]
GROWTH	0.76*	[0.083]	1.34	[0.161]
CF/TA	6.31	[0.205]	9.14	[0.304]
LOG(PROCEEDS)	0.69	[0.385]	-0.50	[0.769]
UNDER. REP	-0.10	[0.710]	0.23	[0.637]
Pseudo R^2	31.01%		40.55%	
No. Of Obs	106		75	

Table 10. Multivariate Analysis of Tobin's Q

This table presents results of OLS regressions, where the dependent variable is equal to the Tobin's Q at fiscal year end. Variable definitions are provided in the Appendix. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A.

	All IPOs [1]	**Non-Backed IPOs** [2]	**Backed IPOs** [3]
INTERCEPT	-0.81***	-0.89*	0.33
	[-2.56]	[-1.78]	[0.90]
BACKED DUMMY	0.19***		
	[2.78]		
RETENTION DUMMY			-0.03
			[-0.40]
PE DUMMY			-0.83***
			[-11.53]
LOG (BOARD SIZE)	-0.39***	-0.05	-0.44***
	[-3.67]	[-0.30]	[-3.55]
PROP. INDEP. DIRECTORS	0.94***	0.71***	0.57***
	[6.39]	[2.54]	[3.28]
ACQ/TA	-0.79***	0.33	-1.10***
	[-2.81]	[0.54]	[-3.40]
CAPEX/TA	-0.03	0.63	-0.03
	[-1.11]	[1.09]	[-1.21]
NO PAYOUT DUMMY	0.33***	0.28*	0.15
	[4.04]	[1.92]	[1.57]
ROA_t	-0.75***	-1.05***	-0.02
	[-9.53]	[-9.48]	[-0.21]
ROA_{t-1}	-0.42***	-0.27***	-0.38***
	[-4.52]	[-2.08]	[-3.02]
ROA_{t-2}	-0.31***	-0.08	-0.37***
	[-4.94]	[-1.09]	[-3.78]
LOG (MV)	0.96***	0.79***	1.09***
	[19.39]	[9.85]	[18.54]
MGT OWN	0.59***	0.35*	0.72***
	[4.09]	[1.89]	[3.75]
INDUSTRY DUMMIES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES
No. Of Obs.	1982	383	1596
R^2	0.3720	0.5418	0.4030

Panel B.

	PE-Backed IPOs		VC-Backed IPOs	
	[1]	[2]	[3]	[4]
INTERCEPT	0.00	-0.83	-2.86***	0.56
	[0.01]	[-1.17]	[-3.67]	[0.32]
RETENTION DUMMY	-0.04	0.87	-0.32*	-4.04**
	[-0.65]	[1.21]	[-1.72]	[-2.27]
LOG (BOARD SIZE)	-0.19*	0.15	-0.45*	-2.84***
	[-1.94]	[0.54]	[-1.91]	[-3.96]
LOG (BOARD SIZE)*RETENTION		-0.36		2.50***
		[-1.25]		[3.35]
PROP. INDEP. DIRECTORS	0.27**	0.26	0.76*	-3.00**
	[2.29]	[1.01]	[1.92]	[-2.18]
PROP. INDEP. DIRECTORS*RETENTION		0.04		4.05***
		[0.14]		[2.92]
ACQ/TA	-0.25	-0.39	-1.18*	-2.70
	[-1.06]	[-0.78]	[-1.83]	[-1.24]
ACQ/TA*RETENTION		0.26		1.94
		[0.48]		[0.85]
CAPEX/TA	0.04***	1.73***	2.33***	-6.17***
	[2.69]	[2.68]	[27.40]	[-2.81]
CAPEX/TA*RETENTION		-1.69***		8.49***
		[-2.61]		[3.87]
NO PAYOUT DUMMY	0.09	0.18	-0.04	4.11***
	[1.51]	[1.27]	[-0.12]	[4.95]
NO PAYOUT DUMMY*RETENTION		-0.10		-4.59***
		[-0.67]		[-5.22]
ROA_t	3.10***	3.10***	-1.23***	-1.22***
	[9.25]	[9.31]	[-9.14]	[-9.16]
ROA_{t-1}	0.22	0.14	-0.37**	-0.41***
	[0.61]	[0.40]	[-2.20]	[-2.47]
ROA_{t-2}	0.37	0.37	-0.32***	-0.30***
	[1.44]	[1.47]	[-2.43]	[-2.40]
LOG (MV)	0.40***	0.40***	2.37***	2.49***
	[8.29]	[8.10]	[22.67]	[24.39]
MGT OWN	0.95***	1.01***	1.07***	1.31***
	[6.33]	[6.72]	[3.02]	[3.72]
INDUSTRY DUMMIES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES
No. Of Obs.	752	752	844	844
R^2	0.5180	0.5254	0.6768	0.7032

Table 11. Endogeneity Tests

Table 11 reports the results of endogeneity tests, where I use instrumental variables approach. The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable is equal to PE/VC ownership retention in Model [1], [3], [5] and [7]. In Model [2] and [4], the dependent variable is equal to the number of directors on the board, whereas the proportion of independent directors is the dependent variable in Model [6] and [8]. In first stage Models ([1], [3], [5] and [7]), the equations are estimated with syndicate size as an instrument for PE/VC syndicate ownership retention. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Board Size					**Panel B. Proportion of Independent Directors**			
	PE-Backed IPOs		**VC-Backed IPOs**		**PE-Backed IPOs**		**VC-Backed IPOs**	
	First Stage	2SLS	First Stage	2SLS	First Stage	2SLS	First Stage	2SLS
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
INTERCEPT	0.41***	6.41***	1.03***	1.49	0.41***	0.50***	1.03***	0.33*
	[2.84]	[6.62]	[4.70]	[0.54]	[2.84]	[5.15]	[4.70]	[1.65]
RETENTION IV: SYNDICATE SIZE	0.06***	1.75*	0.02***	4.81***	0.06***	0.43***	0.02***	0.43***
	[6.47]	[1.91]	[4.47]	[2.59]	[6.47]	[4.64]	[4.47]	[3.24]
MGT OWN	-0.01	-1.36***	-0.16***	-0.24	-0.01	-0.01	-0.16***	-0.05
	[-0.11]	[-2.46]	[-2.33]	[-0.34]	[-0.11]	[-0.26]	[-2.33]	[-1.07]
LEV	0.03	-0.11	-0.12***	0.37	0.03	-0.05***	-0.12***	-0.01
	[1.12]	[-0.59]	[-2.55]	[0.82]	[1.12]	[-2.43]	[-2.55]	[-0.08]
LOG $(MV)_t$	0.09***	0.69***	0.01	0.25	0.09***	-0.06***	0.00	0.03***
	[2.98]	[3.28]	[0.11]	[1.56]	[2.98]	[-2.75]	[0.11]	[2.52]
ROA	0.21	-1.61*	-0.08**	1.32***	0.21	-0.16*	-0.08**	0.02
	[1.34]	[-1.70]	[-2.03]	[3.43]	[1.34]	[-1.68]	[-2.03]	[0.79]
R&D/TA	0.50	-2.57	0.07***	-0.19	0.50	-0.06	0.07***	-0.02
	[1.09]	[-0.92]	[2.87]	[-0.91]	[1.09]	[-0.23]	[2.87]	[-1.62]
Capex/TA	0.00	0.18***	-0.05***	0.22	0.00	-0.02***	-0.05***	0.01
	[0.13]	[2.80]	[-2.86]	[1.41]	[0.13]	[-3.20]	[-2.86]	[1.01]
CF/TA	-0.22	-1.29	0.11***	-1.83***	-0.22	0.27	0.11***	-0.01
	[-1.53]	[-1.47]	[2.49]	[-4.24]	[-1.53]	[3.04]	[2.49]	[-0.38]

FIRM AGE	-0.02	-0.21	0.03	-0.52	-0.02	-0.05***	0.03	-0.02
	[-0.60]	[-1.08]	[0.68]	[-1.60]	[-0.60]	[-2.38]	[0.68]	[-0.72]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES
No. Of Obs.	797	797	897	897	797	797	897	897
Adj. R^2	6.36%	5.96%	9.32%	.	6.36%	.	9.32%	4.18%

Table 12. Endogeneity Tests

Table 12 reports the results of endogeneity tests, where I use instrumental variables approach. The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable is equal to PE/VC ownership retention in Model [1], [3], [5] and [7]. In Model [2] and [4], the dependent variable is equal to the capital expenditure over total assets, whereas acquisition expenditure over total assets is the dependent variable in Model [6] and [8]. In first stage Models ([1], [3], [5] and [7]), the equations are estimated with syndicate size as an instrument for PE/VC syndicate ownership retention. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Panel A. Capital Expenditure				**Panel B. Acquisition Expenditure**			
	PE-Backed IPOs		**VC-Backed IPOs**		**PE-Backed IPOs**		**VC-Backed IPOs**	
	First Stage	2SLS	First Stage	2SLS	First Stage	2SLS	First Stage	2SLS
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
INTERCEPT	0.83***	11.86	-0.01	0.06	0.83***	4.40	-0.03	-0.01
	[16.23]	[0.45]	[-0.07]	[1.12]	[16.10]	[0.35]	[-0.21]	[-0.03]
RETENTION IV: SYNDICATE SIZE	0.01	-13.94	0.03***	-0.14***	0.01	-5.41	0.03***	-0.75***
	[0.47]	[-0.44]	[6.86]	[-2.44]	[0.43]	[-0.36]	[7.47]	[-2.53]
BANK. AFF. DUMMY	0.02**	0.34	-0.03	-0.01	0.02**	0.11	-0.03	-0.03
	[2.06]	[0.53]	[-1.00]	[-0.42]	[2.04]	[0.37]	[-1.12]	[-0.55]
LOW PROXIMITY DUMMY	-0.01	-0.38	0.04	-0.01	-0.01	-0.07	0.04	0.02
	[-0.93]	[-1.15]	[1.57]	[-0.28]	[-0.92]	[-0.44]	[1.60]	[0.42]
CF/TA	0.02	0.38	-0.08***	-0.03***	0.02	0.29	-0.08***	-0.14***
	[0.88]	[0.66]	[-4.04]	[-2.92]	[0.92]	[1.04]	[-3.87]	[-2.92]
M/B RATIO	-0.01	-0.01	0.01	-0.01	-0.01	-0.01	0.01	0.01
	[-0.20]	[-0.06]	[0.62]	[-1.04]	[-0.21]	[-0.08]	[0.65]	[0.37]
CASH/TA	0.02	4.10***	-0.02***	0.11***	0.02	0.13	-0.02***	0.15***
	[1.37]	[6.17]	[-4.77]	[41.52]	[1.38]	[0.43]	[-4.81]	[10.66]
SALES GROWTH	0.00	-0.02	0.01	0.02***	0.00	0.20***	0.01	-0.07***
	[-0.01]	[-0.16]	[1.00]	[5.85]	[-0.01]	[4.80]	[1.05]	[-4.05]
LEV	0.00	-0.08	-0.08***	-0.04***	0.01	0.02	-0.09***	-0.11
	[0.81]	[-0.58]	[-2.36]	[-2.42]	[0.79]	[0.28]	[-2.42]	[-1.31]
R&D/TA	0.02	-3.71***	0.11***	-0.05***	0.02	-0.59	0.11***	-0.06

	[0.21]	[-2.44]	[3.73]	[-3.43]	[0.25]	[-0.87]	[3.76]	[-0.87]
NO PAYOUT DUMMY	-0.02**	-0.20	0.20***	0.04***	-0.02**	-0.09	0.21***	0.16
	[-1.96]	[-0.36]	[5.30]	[2.43]	[-2.02]	[-0.34]	[5.64]	[1.64]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES
No of Obs	1061	1061	1925	1925	1046	1046	1883	1883
Adj R^2	2.97%	.	17.12%	83.04%	3.04%	.	17.60%	23.65%

Figures for Empirical Study 2

Figure 2.1: Annual Average Board Size of Firms

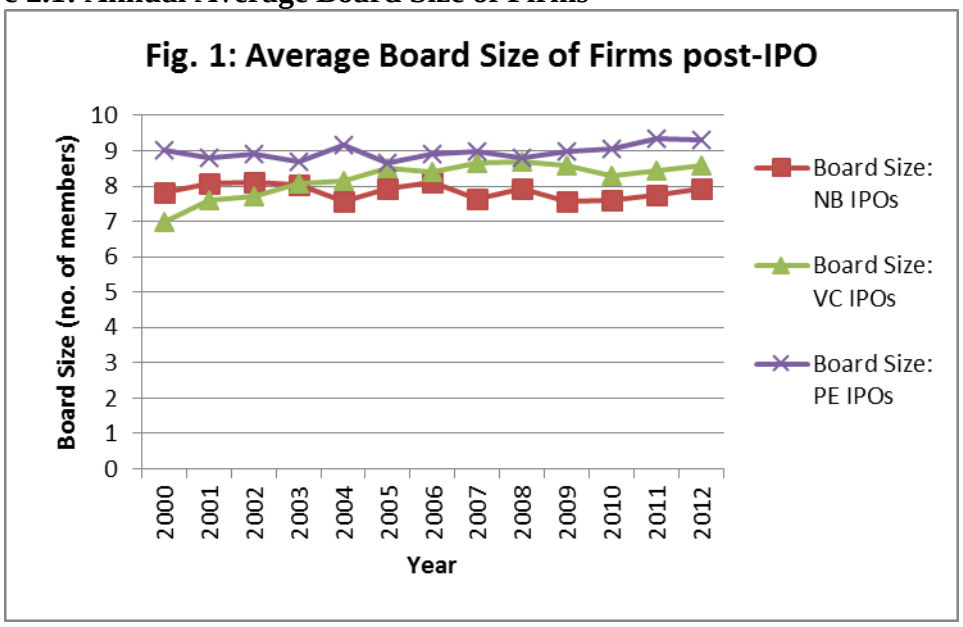


Figure 2.2: Annual Average Proportion of Independent Directors of Firms

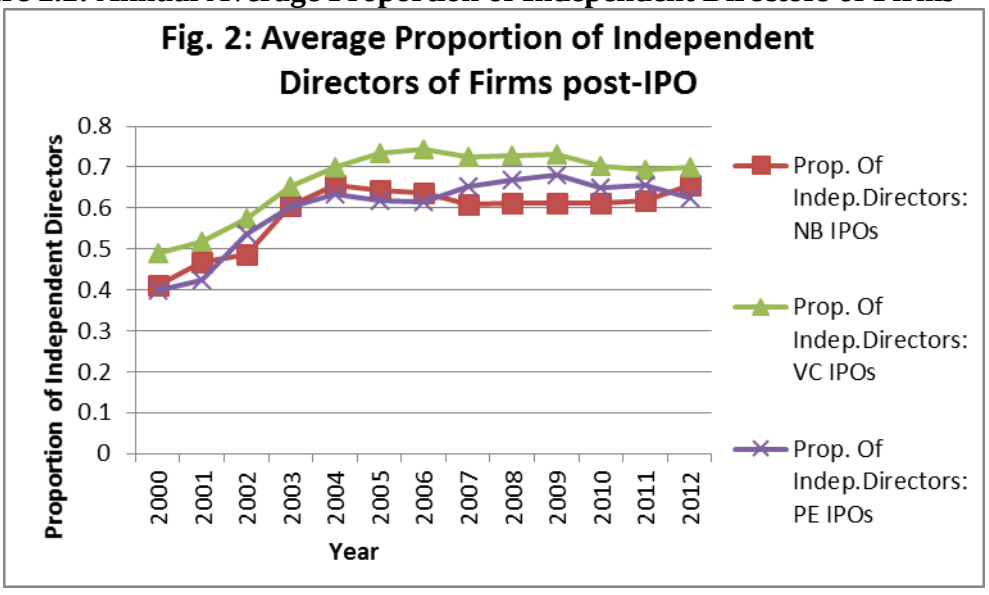


Figure 2.3: Average Board Size of Non-Backed and Backed IPOs Post-Flotation

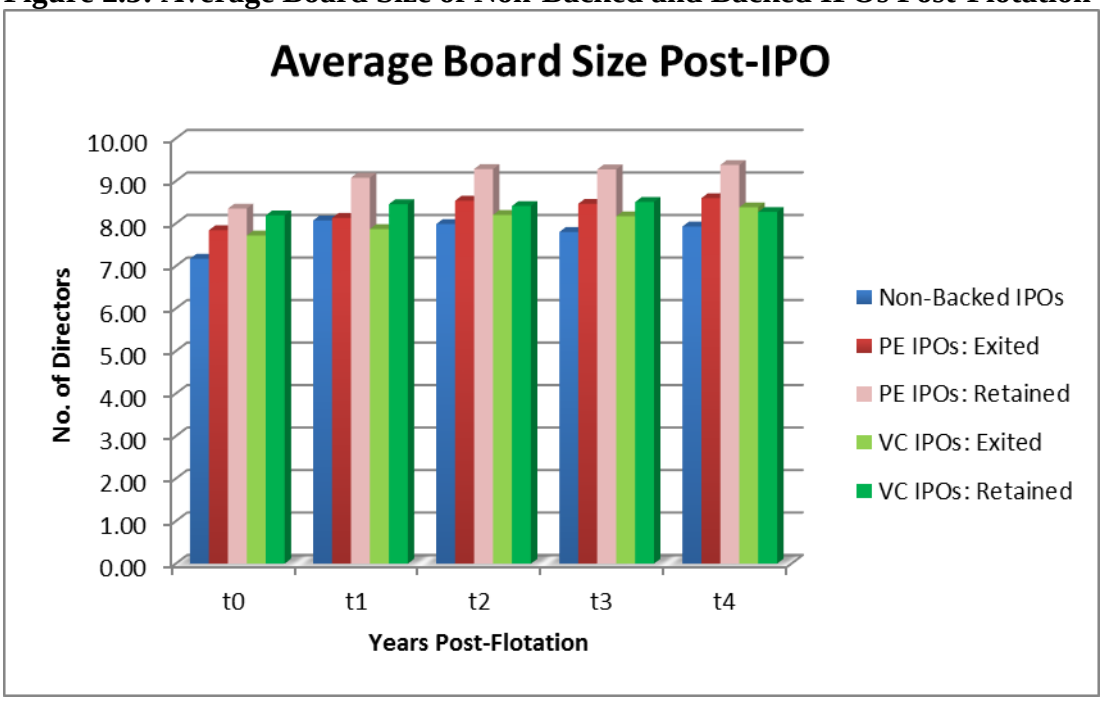


Figure 2.4: Board Composition of Non-Backed and Backed IPOs Post-Flotation

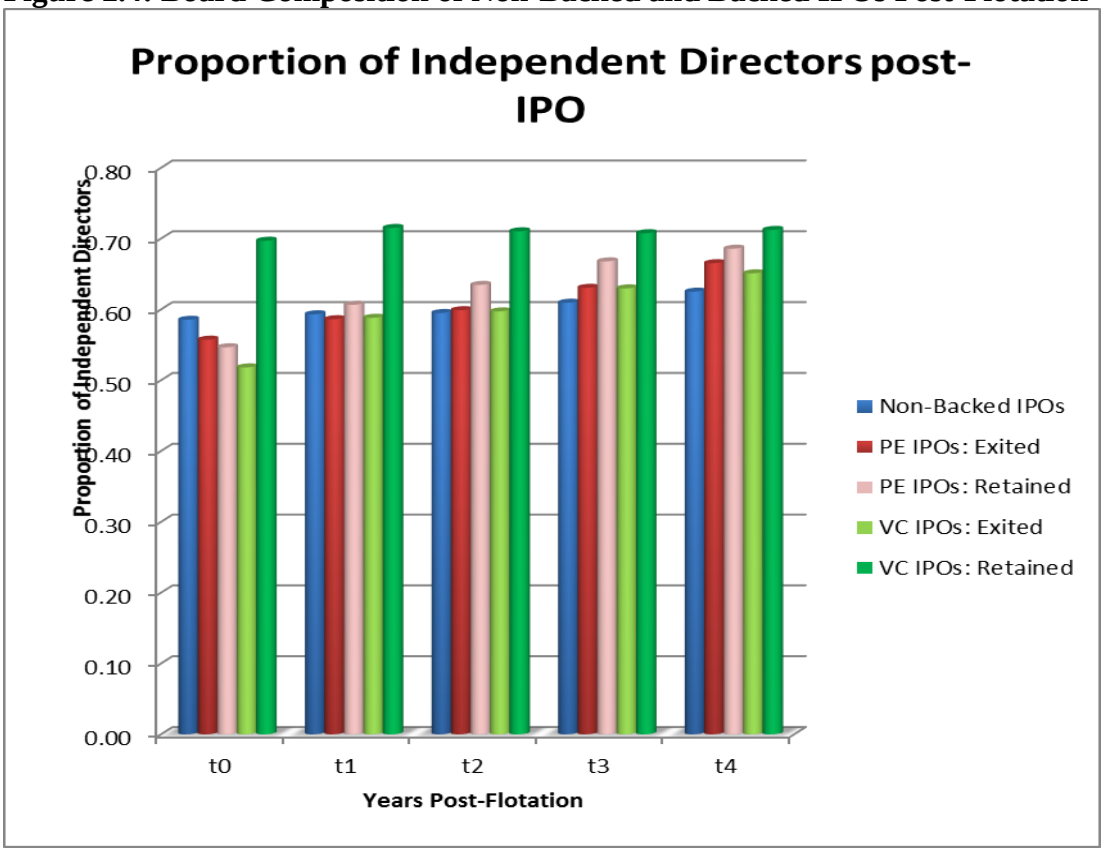
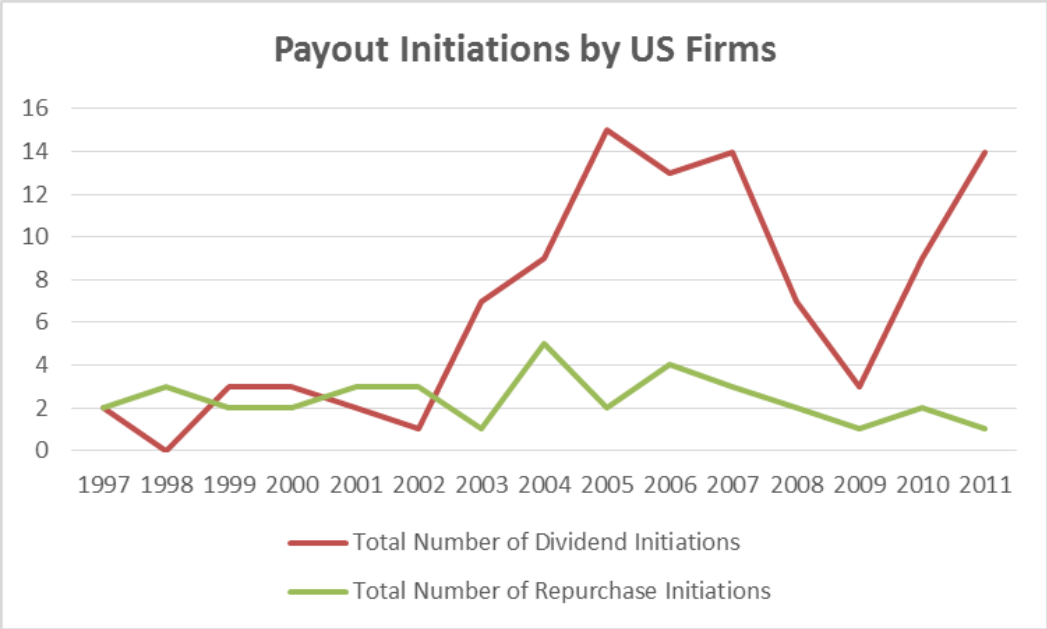


Figure 2.5: Cash Distribution Initiations by IPOs Floated on the US Stock Markets



Appendices for Empirical Study 2

Appendix 1. Definitions of Variables

Variable Name	Definition	Source
Panel A. Board of Directors Characteristics		
Board Size	The number of directors on the company's board.	BoardEx
Board Composition	The proportion of the board which is occupied by independent directors.	BoardEx
Time in the organization: Executive Directors (t_0)	Number of years Executive Directors are in the organization at the time of an IPO (t=0). Executive Director is a full time employed individual who is on the company Board (BoardEx Definition).	BoardEx
Time on the board: Executive Directors (t_0)	Number of years Executive Directors are on the board at the time of an IPO (t=0).	BoardEx
Time in the organization: Supervisory Directors (t_0)	Number of years Supervisory Directors are in the organization at the time of an IPO (t=0). Supervisory Director is any member of a company's Board who is not employed at the company (BoardEx Definition).	BoardEx
Time on the board: Supervisory Directors (t_0)	Number of years Supervisory Directors are on the board at the time of an IPO (t=0). Supervisory Director is any member of a company's Board who is not employed at the company (BoardEx Definition).	BoardEx
Proportion of Firms: Board Size Alteration post-IPO	Proportion of IPOs which have altered their board size (as opposed to board size at the IPO year) during the four years post-flotation.	BoardEx
Proportion of Firms: Board Composition Alteration post-IPO	Proportion of IPOs which have altered their board composition (as opposed to board composition at the IPO year) during the four years post-flotation.	BoardEx
Time to the first post-IPO board size change	Number of years until the first board size change post-flotation. Board size change refers to the comparison of board size at fiscal year t and IPO year.	BoardEx
Time to the first post-IPO board composition change	Number of years until the first board composition change post-flotation. Board composition change refers to the comparison of board composition at fiscal year t and IPO year.	BoardEx

Panel B. Payout Initiation Characteristics		
Proportion of Firms: Dividend Initiations	The proportion of firms which have chosen dividends as their payout initiation mechanism post-flotation.	CRSP
Dividend Cash Amount	US Dollar value per share of cash dividends.	CRSP
Dividend Yield (%)	Annual dividends per share divided by current share price. This variable is expressed in percentage.	CRSP
No. of years to Dividend Initiation	Number of years from IPO date to first dividend payment date.	CRSP
Proportion of Firms: Repurchase Initiations	The proportion of firms which have chosen a repurchase as their payout initiation mechanism post-flotation.	SDC
Value of Transaction ($mil)	The value of repurchase program specified in US Dollar (mil).	SDC
% sought	The percentage sought in the repurchase program.	SDC
No. of years to Repurchase Initiation	Number of years from IPO date to repurchase program completion date.	SDC
Proportion of Firms: Special Dividend	The proportion of firms which have paid a special dividend post-flotation.	CRSP
Special Dividend Cash Amount	US Dollar value per share of cash special dividends.	CRSP
No. of years to Special Dividend Initiation	Number of years from IPO date to special dividend payment date.	CRSP
Proportion of Firms: Primary Use of Proceeds is Acquisitions.	The proportion of firms which have specified in the prospectus that their primary planned use of proceeds is acquisitions.	SDC
PRIM. USE. REF	Dummy variable equals one if the firm has specified in the IPO prospectus that their primary use of proceeds is retiring/refinancing debt, and zero otherwise.	SDC
PRIM. USE. GEN	Dummy variable equals one if the firm has specified in the IPO prospectus that their primary use of proceeds is general corporate purposes, and zero otherwise.	SDC
PRIM. USE. ACQ	Dummy variable equals one if the firm has specified in the IPO prospectus that their primary use of proceeds is financing acquisitions, and zero otherwise.	SDC

Panel C. Spending Patterns and IPO Firm Characteristics

All accounting variables have been collected from COMPUSTAT database. All USD Dollars values are deflated to 2005 dollars. All continuous variables are winsorized at the 1% and 99% levels. Firm-year observations are used to calculate accounting variables' means and medians. The following fiscal years are used: pre-IPO year (t_{-1}) to 2012 or delisting date.

CAPEX/TA	Defined as capital intensity scaled by total assets at fiscal year t.	COMPUSTAT
ACQ/TA	Defined as the ratio of acquisition expenditure to total assets at fiscal year t.	COMPUSTAT
ASSETS	Defined as book value of total assets at fiscal year t.	COMPUSTAT
CASH/TA	Defined as cash and short-term investments scaled by total assets at fiscal year t.	COMPUSTAT
CF/TA	Defined as earnings before extraordinary items plus depreciation divided by total assets at fiscal year t.	COMPUSTAT
ROA	Return on assets is defined as the ratio of earnings before interest and tax over total assets at fiscal year t.	COMPUSTAT
SALES GROWTH	Defined as the difference between sales in fiscal year t and t-1 scaled by total assets.	COMPUSTAT
LEV	Defined as long-term debt scaled by total assets at fiscal year t.	COMPUSTAT
R&D/TA	Defined as Research & Development expenditure scaled by total assets at fiscal year t.	COMPUSTAT
M/B RATIO	Market-to-book ratio is defined as follows: (BV of assets– BV of equity + MV of equity)/ BV of assets. BV is the book value.	COMPUSTAT
LOG $(MV)_t$	Defined as the log of IPO proceeds.	SDC
TOBIN'S Q	Defined as market value of assets divided by book value of assets..	COMPUSTAT, CRSP
UNDER. REPUTATION	Nine-point underwriter reputation measure.	Carter, Dark, and Singh (1998); Jay Ritter website
FIRM AGE	The number of years between IPO and incorporation year.	SDC; Jay Ritter website
NO. Of PROCEED USES	The number of different proceed uses specified in the IPO prospectus.	SDC
HIGH-TECH DUMMY	Dummy variable equals one if the IPO firms is classified as a tech stock, and 0 otherwise. Tech stocks are defined as in Loughran and Ritter (2004). Firms with the following SIC codes are classified as tech: 3571, 3572, 3575,	SDC

	3577, 3578, 3661, 3663, 3669, 3671, 3672, 3674, 3675, 3677, 3678, 3679, 3812, 3823, 3825, 3826, 3827, 3829, 3841, 3845, 4812, 4813, 4899, 7371, 7372, 7373, 7374, 7375, 7378, and 7379.	
Panel D. Financial Sponsors' and Other Characteristics		
RETENTION DUMMY (unlock day)	Dummy variable equals 1 if at first quarter post-unlock day PE/VC syndicate has retained some equity stake, and 0 if PE/VC syndicate made a full exit (i.e. sold all shares).	Thomson One Banker, SDC
RETENTION DUMMY (12th Q post-IPO)	Dummy variable equals 1 if PE/VC syndicate has retained some equity stake three years post-flotation, and 0 if PE/VC syndicate made a full exit (i.e. sold all shares).	Thomson One Banker, SDC
Financial Sponsors' (PE/VC) Own pre-IPO	The percentage of outstanding shares held by PE/VC syndicate as a group at time t (t=pre-IPO, post-IPO, 1,2,3 years post-flotation)	IPO Prospectus, Thomson One Banker
MGT OWN	The percentage of outstanding shares held by directors as a group at time t (t=pre-IPO, post-IPO, 1,2,3 years post-flotation)	IPO Prospectus, Thomson One Banker
SYNDICATE SIZE	The number of PE/VC investors pre-IPO. 'Major Shareholders' section of prospectuses is examined to identify the number of different PE/VC investors who held an ownership immediately prior to flotation.	IPO Prospectus
LOW PROXIMITY DUMMY	Dummy variable equals 1 if PE or VC fund's headquarters and IPO company are located in different countries (i.e. low geographic proximity dummy), and 0 otherwise.	Thomson One Banker, SDC
BANK AFF. DUMMY	Dummy variable equals 1 if fund investor type is an Investment Bank or Other Banking/ Financial Institution, and 0 otherwise (Corporate PE/Venture Fund, Evergreen, Independent Private Partnership, and Investment Advisory Affiliate).	Thomson One Banker
NO BOARD SIZE $CHANGE_{t \text{ vs. ipo } t}$	Dummy variable equals 1 if there has been no change in the board size in fiscal year t in comparison to IPO year (t_0), and 0 otherwise.	BoardEx
NO BOARD COMPOS.	Dummy variable equals 1 if there has been no change in the board composition in fiscal year t in comparison to IPO year (t_0), and 0 otherwise.	BoardEx

$CHANGE_{t \text{ vs. ipo } t}$

Appendix 2. Pearson Correlation Matrix. The following table presents the pairwise Pearson correlation coefficients for US Backed IPOs. * represents significance at 5% level.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Board Size	1													
2 Board Composition	-0.0530*	1												
3 Retention Dummy	0.0889*	0.1978*	1											
4 PE Dummy	0.1261*	-0.1738*	-0.0081	1										
5 MGT OWN	-0.1404*	-0.0707*	-0.0658*	-0.1299*	1									
6 LEV	0.0323	-0.1045*	0.0004	0.3321*	-0.0241	1								
7 LOG(MV)	0.0832*	-0.0502*	0.0689*	0.2008*	-0.0141	0.0018	1							
8 M/B RATIO	0.0028	-0.0032	-0.0032	0.0004	-0.0035	-0.0025	0.0142	1						
9 SALES GROWTH	-0.0081	-0.0045	-0.0063	0.0093	0.0221	0.0068	0.0625*	0.0041	1					
10 ROA	-0.0209	-0.0842*	-0.0448*	0.2695*	-0.0024	-0.0147	0.0485*	0.0058	0.6006*	1				
11 R&D/TA	0.0373	0.0407*	0.0143	-0.1310*	-0.0275	0.1440*	0.0339*	-0.004	0.0016	-0.1040*	1			
12 CAPEX/TA	0.0853*	-0.0341	-0.006	-0.0024	-0.0371*	0.0424*	0.1128*	-0.0014	-0.2163*	-0.3803*	0.3465*	1		
13 ACQ/TA	0.0267	0.0173	-0.0221*	-0.0002	-0.0208	0.0490*	0.1180*	0.0003	0.0016	0.0066	0.2989*	0.2958*	1	
14 CF/TA	-0.0744*	-0.0556*	-0.0318*	0.2007*	-0.0033	-0.0191*	0.2640*	0.015	0.1884*	0.7089*	-0.2160*	0.0313*	0.0403*	1
15 IPO FIRM AGE at IPO	0.008	-0.1381*	-0.0335*	0.4532*	-0.0699*	0.0810*	0.0752*	-0.0071	0.0106	0.0646*	-0.0569*	-0.0049	-0.007	0.1014*
16 HIGH-TECH Dummy	-0.1043*	0.0276	0.0642*	-0.2525*	0.0647*	-0.0413*	-0.0054	0.0193	0.0127	0.0068	0.0109	-0.0212*	-0.009	-0.003
17 BANK AFF. Dummy	0.0582*	0.0074	0.0712*	0.1154*	-0.0413	0.0215	-0.0338	-0.002	0.005	0.0036	-0.0184	-0.0168	-0.007	-0.007
18 LOW PROXIMITY Dummy	0.0537	0.2408*	0.0685*	-0.1292*	-0.0721*	-0.0802*	0.0095	-0.0203	0.0044	-0.0726*	0.0262	-0.0384*	-0.021	-0.0597*
19 NO BOARD SIZE CHANGE$_{t-1}$	-0.1954*	0.0029	-0.0157	0.0204	0.0911*	-0.0125	0.0405	-0.0256	-0.0011	0.0381	-0.0034	0.0036	-0.005	0.0388
20 NO BOARD COMPOS. CHANGE$_{t-1}$	-0.2317*	-0.0127	-0.0356	0.0153	0.0992*	-0.0047	0.0538*	-0.0268	0.0008	0.0357	0.0054	0.0139	-0.001	0.0386
21 NO BOARD SIZE CHANGE $_{t \text{ vs. ipo } t}$	-0.2099*	-0.1267*	0.0007	-0.0415	0.2634*	-0.0123	0.0409	0.0139	-0.0047	0.0305	-0.0297	-0.0283	-0.027	0.0283
22 NO BOARD COMPOS. CHANGE $_{t \text{ vs. ipo}}$	-0.2037*	-0.1793*	-0.0224	-0.0335	0.2790*	0.0235	0.0492*	0.0126	0.0294	0.0195	-0.0334	-0.0263	-0.024	0.0143
23 UNDERPRICING	-0.0372	-0.0291	-0.0188	-0.1121*	0.0339	-0.0526*	0.0329*	-0.001	0.0004	-0.0164	0.0181	-0.0011	0.0048	-0.013
24 UNDER. REPUTATION	0.1233*	-0.0618*	0.1699*	0.1194*	-0.0987*	0.0211*	0.4240*	0.0034	0.0091	0.1443*	0.0058	0.0333*	0.0279*	0.1447*
25 NO. Of PROCEED USES	-0.0164	0.1917*	0.0851*	-0.0072	-0.0299	-0.0389*	0.0646*	0.0024	0.0145	0.0153	-0.0189*	-0.0186*	-0.008	0.0296*
26 ACQ - PRIMARY USE OF PROCEEDS	-0.0335	0.0268	-0.0324*	0.0385*	0.0319	0.0393*	-0.0526*	-0.0038	0.0022	0.0016	-0.0128	-0.0074	-5E-04	-0.007

	15	16	17	18	19	20	21	22	23	24	25	26
15 IPO FIRM AGE at IPO	1											
16 HIGH-TECH Dummy	-0.1201*	1										
17 BANK AFF. Dummy	0.013	-0.0158	1									
18 LOW PROXIMITY Dummy	-0.0656*	0.0435*	0.1011*	1								
19 NO BOARD SIZE CHANGE$_{t-1}$	0.0031	-0.0147	-0.0111	0.0295	1							
20 NO BOARD COMPOS. CHANGE$_{t-1}$	-0.0033	-0.0039	0.005	0.0786*	0.8355*	1						
21 NO BOARD SIZE CHANGE $_{t \text{ vs. ipo } t}$	0.02	0.0553*	0.018	0.0974*	0.4100*	0.3604*	1					
22 NO BOARD COMPOS. CHANGE $_{t \text{ vs. ipo}}$	-0.0045	0.0249	0.0084	0.1569*	0.3877*	0.4965*	0.8443*	1				
23 UNDERPRICING	-0.0851*	0.0712*	0.0025	0.0029	-0.0186	-0.0015	0.0215	0.0141	1			
24 UNDER. REPUTATION	0.0449*	0.0417*	0.0142	-0.0018	-0.0013	-0.01	-0.0168	-0.0257	0.0007	1		
25 NO. Of PROCEED USES	0.0605*	0.0523*	-0.0774*	0.2879*	-0.0139	0.0134	0.0374	0.0303	-0.0344*	-0.1053*	1	
26 ACQ - PRIMARY USE OF PROCEEDS	-0.0292*	0.005	-0.0612*	0.0283*	-0.0126	-0.0253	0.0203	0.0295	0.014	-0.0206*	0.0145	1

Appendix 3. Board of Directors' Features Post-Flotation

The following table provides summary statistics of the board size and composition for non-backed IPOs and backed IPOs. Within backed IPOs, descriptive statistics are presented for exited and retained samples. Diff [t_o-t_{+1}] shows the difference-in-means and medians between IPO Year (t_o) and one year post-IPO (t_{+1}) values (t-statistics and MW row values). t_o corresponds to the IPO year. Board size and board composition definitions are provided in the Appendix. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Board of Directors' Features Post-Flotation

	Non-Backed IPOs		**PE-Backed IPOs**				**VC-Backed IPOs**			
			Exited		**Retained**		**Exited**		**Retained**	
	[1]		[2]		[3]		[4]		[5]	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
					Board Size					
t_0	7.17	7.00	7.84	8.00	8.35	8.00	7.72	8.00	8.19	8.00
t_1	8.07	8.00	8.13	8.00	9.08	9.00	7.87	8.00	8.45	8.00
t_2	7.99	8.00	8.54	9.00	9.28	9.00	8.20	8.00	8.41	8.00
t_3	7.80	8.00	8.46	8.00	9.27	9.00	8.17	8.00	8.51	8.00
t_4	7.93	8.00	8.60	8.50	9.38	9.00	8.38	8.00	8.27	8.00
Diff [t_0-t_{+1}]	-3.80***	[0.00]	-0.78	[0.36]	-3.09***	[0.00]	-0.48	[0.61]	-1.40	[0.03]
					Board Composition					
t_0	0.59	0.60	0.56	0.57	0.55	0.56	0.52	0.50	0.70	0.71
t_1	0.59	0.60	0.59	0.61	0.61	0.63	0.59	0.70	0.71	0.75
t_2	0.59	0.60	0.60	0.60	0.63	0.64	0.60	0.60	0.71	0.75
t_3	0.61	0.61	0.63	0.65	0.67	0.70	0.63	0.63	0.71	0.75
t_4	0.63	0.63	0.67	0.68	0.69	0.71	0.65	0.67	0.71	0.75
Diff [t_0-t_{+1}]	-0.40	[0.72]	-0.70	[0.31]	-3.21***	[0.00]	-2.35**	[0.01]	-1.19	[0.18]

Appendix 4. Robustness Check

This table presents results of OLS regressions, where the dependent variable is equal to the number of directors on the board (Panel A and C), and proportion of independent directors on the board specified in decimals (Panel B and D). In Panel C and D, an additional independent variable is added to the regressions (bank-affiliation dummy). PE/VC VOL OWN refers to financial sponsors' voluntary ownership at time t. Other variable definitions are provided in the Appendix. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Panel A. Board Size						**Panel B. Proportion of Independent Directors**					
	Backed IPOs		**PE-Backed IPOs**		**VC-Backed IPO**		**Backed IPOs**		**PE-Backed IPOs**		**VC-Backed IPO**	
	coef.	t-stat	coef.	t-stat	coef.		coef.	t-stat	coef.	t-stat	coef.	t-stat
	[1]		[2]		[3]		[4]		[5]		[6]	
INCERCEPT	7.53***	[5.04]	6.77***	[7.42]	8.82***	[6.65]	0.88***	[7.97]	0.56***	[8.23]	0.75***	[7.97]
PE DUMMY	0.74***	[4.48]					-0.08***	[-6.19]				
PE/VC VOL OWN	1.52***	[5.27]	1.8***	[4.29]	0.94**	[2.25]	-0.01	[-0.12]	-0.06*	[-1.77]	0.08***	[2.82]
MGT OWN	-1.19**	[-2.22]	0.06	[0.06]	-1.55***	[-2.77]	-0.09***	[-2.32]	0.03	[0.43]	-0.12***	[-3.14]
LEV	-0.20	[-1.14]	-0.16	[-0.71]	-0.19	[-0.59]	-0.04***	[-2.89]	-0.04**	[-2.27]	-0.05**	[-2.09]
LOG $(MV)_t$	0.46****	[3.82]	0.88***	[4.18]	0.23*	[1.70]	0.01	[0.94]	-0.01	[-0.68]	0.03***	[3.28]
ROA	0.70**	[2.25]	-0.95	[-0.89]	1.05***	[3.62]	-0.04*	[-1.79]	-0.05	[-0.60]	-0.02	[-0.80]
R&D/TA	-0.11	[-1.00]	-2.46	[-0.79]	0.05	[0.29]	0.01*	[1.88]	0.24	[1.02]	-0.01	[-0.69]
Capex/TA	0.15***	[2.50]	0.15*	[1.94]	0.07	[0.56]	-0.02***	[-3.48]	-0.02***	[-2.90]	0.00	[-0.08]
CF/TA	-1.64***	[-4.95]	-1.75**	[-1.96]	-1.57***	[-4.64]	0.08***	[3.19]	0.11*	[1.70]	0.03	[1.27]
FIRM AGE	-0.29*	[-1.70]	-0.34	[-1.52]	-0.37	[-1.20]	-0.04***	[-3.49]	-0.06***	[-3.56]	0.00	[-0.14]
INDUSTRY DUMMIES	YES		YES		YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES		YES		YES	
No. Of Obs.	1326		634		692		1326		634		692	
Adj. R^2	9.50%		7.53%		16.15%		27.05%		14.69%		39.89%	

	Panel C. Board Size				anel D. Proportion of Independent Directo			
	PE-Backed IPOs		VC-Backed IPO		PE-Backed IPOs		VC-Backed IPO	
	coef.	t-stat	coef.	t-stat	coef.	t-stat	coef.	t-stat
	[1]		[2]		[3]		[4]	
INCERCEPT	5.78***	[4.48]	7.34***	[4.04]	0.88***	[10.01]	0.59***	[4.58]
PE DUMMY								
PE/VC VOL OWN	2.14***	[3.54]	1.54***	[3.19]	-0.20***	[-4.73]	0.03	[0.80]
MGT OWN	-1.02	[-0.56]	-1.05	[-1.60]	0.00	[-0.04]	-0.19***	[-4.04]
LEV	-0.30	[-0.94]	0.11	[0.28]	-0.05**	[-2.21]	-0.04	[-1.33]
LOG $(MV)_t$	1.01***	[3.30]	0.22	[1.42]	-0.03	[-1.43]	0.03***	[2.65]
ROA	-1.96	[-1.18]	0.85***	[2.76]	-0.10	[-0.89]	-0.02	[-1.12]
R&D/TA	-11.87***	[-2.41]	-0.19	[-0.63]	-0.19	[-0.56]	-0.03	[-1.15]
Capex/TA	0.15*	[1.74]	-0.04	[-0.31]	-0.02***	[-2.87]	0.00	[-0.45]
CF/TA	-0.71	[-0.53]	-1.23***	[-3.20]	0.13	[1.42]	0.03	[1.25]
FIRM AGE	-0.58*	[-1.66]	0.08	[0.22]	-0.05**	[-2.04]	-0.02	[-0.88]
BANK AFF. DUMMY	0.55	[1.42]	-0.21	[-0.73]	0.05*	[1.77]	0.02	[1.06]
INDUSTRY DUMMIES	YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES	
No. Of Obs.	341		493		341		493	
Adj. R^2	14.16%		14.78%		16.98%		36.97%	

Chapter 4: Do PE and VC Firms Monitor Cash Reserves post-IPO?[70]

Abstract
The paper examines the impact of PE and VC ownership retention on financially sponsored IPOs' cash reserves. The results show that backed IPOs with higher VC (PE) ownership concentration maintain significantly higher (lower) cash ratios post-flotation, which is driven by fundamentally different growth opportunities of these firms. Post-IPO voluntary ownership retention of PE and VC investors mitigates the agency problems, which allows financially constrained firms to hoard cash. PE and VC syndicate characteristics (bank affiliation and syndicate size) have significant impact on cash reserves. Moreover, the market values positively in the long-run cash held by companies with post-IPO PE investors' equity ownership. Overall, these results suggest that continued involvement of financial sponsors in the post-flotation period is value creating.

Keywords: Private equity; Venture capital; IPOs; Ownership; Financial Constraints; Aftermarket Performance; Cash Reserves.

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4.1 Introduction

Corporate cash reserves have increased substantially in recent years. Bates *et al* (2009) report that cash holdings of US firms doubled from 1986 to 2006. The *Financial Times* reports that just five companies[71] hold $387 billion of cash, which is equivalent to the United Arab Emirates' gross domestic product in 2013 (Sakoui, 2014). In 2013, Apple held $146.8 billion, while Microsoft $80.7 billion in cash reserves.

However, the extant literature documents a number of drawbacks of high corporate cash holdings. Jensen (1986) argues that entrenched managers are more likely to retain cash than pay dividends. Corporate resources and cash can be tunnelled by managers for their private benefits such as acquisition of perks, empire building, higher wages and investments in unprofitable projects (Shleifer and Vishny, 1989; Fresard and Salva, 2010). As a result of being vulnerable to agency conflicts, cash becomes less valuable to shareholders and they place a smaller value at one dollar of cash (Dittmar and Mahrt-Smith, 2007). Hence, although high cash reserves can be beneficial to finance daily operations and profitable investment opportunities, as well as used as a buffer against sudden cash flow shocks (Keynes, 1936), investors should be aware of negative value implications of excessive cash reserves with low monitoring.

Certain types of investors are able to monitor managers' actions and implement major corporate changes by means of a block equity ownership and representation on the board of directors. Many activist investors, such as Carl Icahn, target firms with high cash holdings and pressure managers to distribute cash to shareholders in the form of dividends, share buybacks or invest in projects, which would result in higher

[71] Apple, Microsoft, Google, Verizon Comm., and Samsung Electronics.

returns than a pile of cash. Several studies (Cronqvist and Fahlenbrach, 2009; Chen *et al*, 2000) find that block holders and institutional investors are active monitors, and have significant impact on US firms' corporate policies and performance. However, previous studies have not focused on the relationship between cash holdings and PE and VC investors in the post-IPO period, even though the extant literature finds that these investors are effective monitoring agents (Krishnan *et al*, 2011; Celikyurt *et al*, 2014).

Research in this area is highly warranted for several reasons. First, private equity and venture capital represent the alternative source of financing available to firms in comparison to more traditional debt financing from investment banks. As a consequence of the recent 2007/2008 financial crisis, many banks are capital-constrained, and hence are unable to lend as much as before the crisis. This topic is especially important in some US states (for example, the commonwealth areas of Pennsylvania), where a great emphasis is put on small businesses. For these firms, venture capitalists could provide financing and access to valuable advice, which would help companies reach the next development/growth stage. Secondly, PE- and VC-backed IPOs are prime drivers of IPO activity in the US. This is especially the case after the recent financial crisis during which these investors could not realize their returns and they still need to make an exit. According to the Ernst and Young report (2014), financially sponsored IPOs represent 62% of US IPOs, 31% of all global IPOs, and there is a robust pipeline of financially sponsored IPOs in the near future.

Third, these investors play a vital role in US economy by fostering entrepreneurial firms and employment: small and medium-sized business establishments represent 63% of new private-sector jobs, 48.5% of employment, and

46% of output (SBA Office, March 2014). Fourth, the asset allocation to non-traditional asset classes such as PE and VC has increased substantially due to the asset class' favourable past performance. Harris *et al* (2014) document PE funds' outperformance of the S&P 500 net of fees and carried interest throughout the 1980-2010 time period, while VC funds' demonstrated outperformance (underperformance) of public markets during the 1990s (2000s). In 2009, 24.3% of the Yale Endowment portfolio was invested in private equity class, while in 2013 its allocation has increased to 32%, which was motivated by PE/VC asset class' return potential and diversifying power (Yale Endowment Report, 2013). The Yale endowment long-term plan is "…well suited to exploiting illiquid, less efficient markets such as venture capital, leveraged buyouts, oil and gas, timber, and real estate" (Yale Endowment Asset Allocation, 2013). Finally, it's important to consider and examine the effect of PE and VC investors on corporate cash reserves because both type of financing nurture their portfolio companies to the IPO stage. At that point, the wealth of new investors, who buy IPO firms' shares, are impacted by PE and VC investors' monitoring in the post-IPO period.

Given a high proportion of PE and VC investors' unrealized returns at the IPO date[72] and their retained high equity holdings in the post-IPO period, I expect these investors to continue their monitoring activities when their portfolio firm is publicly quoted, particularly in relation to corporate cash reserves, and to affect the IPO long-term performance which previous studies identified as puzzling (Ritter, 1991; Ritter, 2013; Brav and Gompers, 1997; Levis, 2011).

[72] Past studies (Barry *et al*, 1990, Cao, 2011) report that VC and PE investors do not exit completely at the IPO date.

I find that on average VC IPOs maintain a significantly higher cash ratio[73] in all industries than PE-backed IPOs. This is driven by the fact that VC-backed IPOs are young firms with high growth and investment opportunities which require cash to finance their growth. In contrast, PE-backed IPOs are mature, old and large companies with stable free cash flows and low growth opportunities which are prone to agency conflicts. I document that IPOs with higher VC (PE) investors' voluntary ownership concentration maintain significantly higher (lower) cash ratios post-flotation than their peers with lower equity holdings. This relationship holds even after accounting for all the control variables. The transaction, precautionary, monitoring and agency theories partly explain corporate cash reserves of financially sponsored IPOs, suggesting that their cash holding is likely to be optimal.

My results indicate that financial constraints in backed IPOs negatively impact the corporate cash reserves. However, I demonstrate that financially constrained backed IPOs which are retained by financial sponsors in the post-flotation period are able to hoard more cash. I document that following a full exit by financial sponsors in the post-flotation period, firms experience a significant increase in financial constraints. I run some robustness tests (e.g. alternative definitions of dependent and independent variables, instrumental variable approach) and find relatively similar results. I also contribute to the existing literature by documenting that PE and VC syndicate characteristics have a significant, long lasting impact on cash reserves: financial sponsors' bank affiliation has a negative effect on backed IPOs' cash holdings, which is in line with Hellmann *et al* (2004), whereas syndicate size has a statistically positive impact.

[73] Cash ratio as defined as the proportion of assets which is held in cash.

In line with Ritter (2013), I find support for the market overreaction hypothesis as the short period excess returns are positive, but in the long-run, backed IPOs underperform significantly. I document that retained VC-backed IPOs with high cash ratio significantly outperform peers with low cash ratio, thereby suggesting that VC portfolio firms need high cash reserves to finance growth, which results in long-run superior performance. I also find support for the hypothesis that the market values cash more in companies in which PE investors voluntarily retain equity in the post-flotation period; this finding does not apply to venture capitalist. This finding implies that the pre-IPO financial sponsors are able to mitigate agency conflicts in firms which are most prone to experience these problems, and they positively contribute to the IPO firm's aftermarket performance. Using an alternative methodology (Faulkender and Wang, 2006) as a robustness test, I find that the marginal value of an extra dollar of cash decreases with the level of cash and leverage in *retained* financially-sponsored IPOs only.

I contribute to the growing literature stream which reports ballooning cash reserves and their declining value to shareholders (Bates *et al*, 2009; Dittmar and Mahrt-Smith, 2007). My findings indicate that financially sponsored IPOs are partially responsible for increasing US corporate cash reserves. I find that during my sample period (1996-2010), the average cash ratio of PE-backed IPOs has doubled from 10% to 20%. Similarly, VC-backed IPOs' cash reserves have experienced an increase from 41% to 60%. This paper also contributes to studies (Cronqvist and Fahlenbrach, 2009; Chen *et al*, 2012) which report that institutional investors are active monitoring agents of US firms who positively affect the firm's performance. I demonstrate that PE and VC investors represent a special type of block holders,

whose expertise and pre-IPO involvement results in portfolio companies' superior performance.

This paper is also related to PE and VC literature, which documents financial sponsors' monitoring effectiveness and favorable impact on corporate governance and innovation (Krishnan *et al*, 2011; Celikyurt *et al*, 2014). My findings focus on financial sponsors' effect on corporate cash reserves, which could be easily misused by manages, and demonstrate that PE investors are able to effectively mitigate the agency conflicts. My results suggest that financial sponsors' involvement does not terminate at the IPO date, and these investors remain active in monitoring and shaping portfolio firms' cash policy in the post-flotation period.

My results can also be related to the debate regarding financial sponsors' ability to extract private benefits by means of their private information, high equity stake and representation on the board of directors. I demonstrate that financial sponsors do not waste corporate cash reserves, but rather reduce agency problems, which proves to create value in the long-run. In sum, my results imply that financial sponsors shape portfolio firms' cash policy in accordance with their growth opportunities, reduce agency conflicts and positively affect firm value, which is beneficial to shareholders in the long-run.

The paper proceeds as follows: Section 2 provides literature review and hypotheses' development. Section 3 describes the sample and methodology. Section 4 presents empirical results, and section 5 describes some additional robustness checks. Section 6 concludes the paper.

4.2 Literature Review and Hypotheses

4.2.1 Impact of Cash Reserves on Firm Value

Bates *et al* (2009) document that the average US firms' cash ratio has more than doubled from 1980 to 2004, which is primarily driven by non-dividend paying firms. They attribute this increase to more risky cash flows, higher R&D expenditures, and a reduction in inventories, receivables and capital expenditures. Several studies which examine the relationship between cash holdings and firm value in US (Dittmar and Mahrt-Smith, 2007) or across countries (Pinkowitz *et al*, 2006) conclude that weaker investor protection and corporate governance have significant negative effects on cash value. Cash is prone to be misused by managers of firms with weak corporate governance on unnecessary capital and acquisition expenditures (Harford *et al*, 2008).

More recently, Chen *et al* (2012) examine the impact of analyst coverage decrease on the value of cash reserves, and find that shareholders value cash less in firms which experience an exogenous analyst coverage decline in anticipation of future agency problems. Their findings suggest that the market considers financial analysts to be important outside monitoring agents, who play a vital role in questioning management's behaviour, actions and mitigating agency problems.

Boubaker *et al* (2014) find that managers of firms which are less subject to shareholders scrutiny, proxied by the distance from financial centre, accumulate significantly more cash, instead of distributing it to their shareholders. This relationship is more pronounced in firms with controlling shareholder having high levels of excess control, suggesting that the cash holding is likely to be used for their own private benefits. In sum, the extant literature concludes that firms are likely to retain cash because of agency conflicts considerations. These arguments motivate the question as to whether PE and VC equity holdings mitigate such conflict.

4.2.2 PE and VC Investors' Financing and Monitoring Effectiveness

Previous studies (Degeorge and Zeckhouser, 1993; Holthhausen and Larcker, 1996; Cao and Lerner, 2009) report PE-backed IPOs' outperformance relative to non-financially sponsored firms. Levis (2011) concentrates on the UK market and finds PE-backed IPOs to be the best performers followed by VC- and non-backed IPOs, which both demonstrate negative abnormal buy-and-hold returns. In the US, Ritter (2013) reports that PE- and VC-backed IPOs outperformed non-financially sponsored peers throughout 1980s and 1990s.[74] Several studies (Acharya *et al*, 2010; Cressy *et al*, 2007) conclude that the magnitude of performance improvements and post-buyout performance heavily depend on PE management expertise and industry specialization. However, Cao (2011) finds that shorter restructuring period of portfolio companies by PE investors (or buyout sponsors), which happens during high industry valuations and hot IPO periods, leads to greater deterioration in long-term performance.

The superior aftermarket performance of backed IPOs is attributed to a variety of factors. PE and VC investors exert pressure and conduct intensive restructuring of their portfolio firms, while they are under their private control, by means of a block equity ownership and representation on the board of directors. Katz (2009) finds that firms with majority PE investors' ownership generate better stock price performance. Levis (2011) shows that the relationship between three year stock price performance and PE ownership retained after the IPO is positive, but it is negative for VC holdings.

Jensen (1986, 1989) argues that buyout (or PE) organization form is superior to others as a result of higher levels of debt, management expertise, and board representation, which lead to close monitoring. Cornelli and Karakas (2010) find that

[74] Ritter (2013) reports that PE- (VC)-backed IPOs demonstrate an average buy-and-hold abnormal return of 5.60% (-12.90%), in contrast to non-backed IPOs' average return of -30.10%.

PE investors often reduce the size of the board of directors and replace the CEO. Acharya *et al* (2009) conclude that PE-backed public firms' boards are much more collaborative and effective than those of non-backed peers. Cronqvist and Fahlenbrach (2009) document that large block holders (including PE firms) have significant impact on US firms' performance and corporate policies, particularly, investment, financing and executive compensation. Cressy *et al* (2007) find that PE sponsors' industry specialization adds 8.5% to portfolio firm's performance, whereas lower managerial ownership (Holthhausen and Larcker, 1996) and longer holding periods (Cao and Lerner, 2009) have negative effects on performance of reverse leverage buyouts.

Similarly, following VC financing, firms' boards become more independent (Baker and Gompers, 2003; Hochberg, 2003), with higher VC representation (Lerner, 1995; Celikyurt *et al,* 2012). VC investors discipline and incentivize the management team by incorporating ventures in states with weak anti-takeover laws (Chemmanur, 2010), decentralizing the decision making and linking compensation plans to performance by means of stock options (Baker and Wruck, 1989). To facilitate monitoring, VC investors even ask the firm to relocate to be closer to VC headquarters (Tian, 2011). Krishnan *et al* (2011) argue that the superior VC-backed firms' performance is achieved not only by reputable VC investors selecting higher quality firms, but also by actively shaping corporate governance post-flotation. VCs create product market value by nurturing innovation and financial market value in young, early stage portfolio firms (Tian, 2011). Representation of VC investors on the boards of portfolio firms is associated with increases in innovation, R&D intensity and deal activity (Celikyurt *et al*, 2014).

Previous studies find a number of factors which affect the degree of financial sponsors' monitoring. Bank-affiliated PE and VC funds conduct lower levels of monitoring (than funds with other ownership structures) due to their managers' representation on a higher number of portfolio firms' boards (Caselli *et al*, 2010), which leads to a negative impact on sales growth. Botazzi *et al* (2008) report that general partners (or GPs) with prior business, recruitment and fundraising experience tend to undertake a more active monitoring style.

The extant literature suggests that PE and VC investors are effective monitoring agents. For example, Krishnan *et al* (2011) demonstrate that in post-flotation period VC investors are actively involved in shaping corporate governance, which ultimately has a positive impact on the aftermarket performance. Similarly, Cao (2011) reports that PE investors' presence post-flotation improves operating performance of reverse leverage buyouts. Also, financial sponsors' involvement and continued presence in firms post-flotation improves corporate governance (Krishnan *et al*, 2011; Cornelli and Karakas, 2012; Hochberg, 2011). Overall, past studies conclude that PE and VC investors improve portfolio companies' performance by monitoring, restructuring and value creation.

4.2.3 Hypotheses

These findings imply that on top of intense pre-IPO restructuring and value-adding activities, financial sponsors are likely to monitor their sponsored firms, even after the flotation. More specifically, I expect financial sponsors with post-IPO equity ownership to monitor their portfolio companies' cash reserves, oversee its use by managers, and, thereby, mitigate the agency problems associated with cash holdings. This is primarily driven by a high proportion of financial sponsors' unrealized returns

at the IPO date, and the need to fully divest at a high stock price in the post-flotation period to maintain their favorable track records and high internal rate of returns (IRR), which prospective investors use in selecting PE and VC funds when they allocate their capital (Fleming, 2010).

Financial sponsors monitor their investments by means of a high block ownership and board representation. PE and VC investors do not sell all of their equity holdings at the IPO (Barry *et al*, 1990; Megginson and Weiss, 1991; Lin and Smith, 1998; Cao, 2011). This post-IPO equity retention is partly explained by the existence of lockup agreements, which oblige pre-IPO investors to retain a certain percentage of the firm's shares for a specified period of time. However, past studies demonstrate that PE and VC investors choose to retain ownership well after the lockup expiration date.[75] Cao (2011) reports that, on average, buyout sponsors retain 23.95% of the firm's shares and a quarter of the board's seats three years after the flotation. Field and Hanka (2001) find that even after one year post-flotation VC investors hold, on average, approximately 17% of the firm's outstanding shares.

The importance of reputation cannot be overemphasized in the private equity industry. Favorable PE and VC firm's reputation enhances access to stream of deal flows (Hsu, 2004), facilitates the ease of syndication (Hochberg *et al*, 2007), and future fundraising, as well as allows to act as a lead syndicate member in future deals. Since an IPO is the most visible exit route (Krishnan and Masulis, 2010), PE and VC firms are incentivized to induce a high level of monitoring even post-flotation (given that they retain a block ownership) with the goal of maintaining their reputation.

Dittmar and Mahrt-Smith (2007, p. 603) state that "…large shareholders with incentives to monitor management improve the governance of the firm from within,

[75] In the US, the average lockup period is 180 days (Brav and Gompers, 2003).

by taking steps to protect their own investments in the face of potential managerial agency conflicts." Hence, PE and VC investors are incentivized to monitor portfolio firms post-flotation and minimize potential managerial expropriation of outside shareholders because of a high proportion of unrealized returns and a great concern for reputation.

However, I expect the relationship to be of opposite signs for PE and VC voluntary ownerships, which is driven by fundamentally different types of firms these investors invest in. PE-backed firms are usually mature, large, publicly quoted companies in non-high-tech industries (Fraser-Sampson, 2010). These firms are usually at the maturity stage of the business cycle, with very limited growth opportunities and high free cash flows. PE-backed firms are especially prone to agency conflicts as a result of their fundamental firm characteristics, and hence, cash is highly likely to be misused by managers in these firms. Therefore, this leads me to expect PE investors with post-IPO equity ownership to minimize corporate cash reserves, whose misuse by managers would deteriorate PE sponsors' final return.

In contrast to PE houses, VC investors' main objective is to identify ventures with a prospective idea rather than current profitability or entrenched management. Hence, firms which receive VC financing are young, high-tech affiliated companies with high growth opportunities. These firms are usually at the start-up stage of the business cycle, and have not generated profits or previously sold product commercially (Fraser-Sampson, 2010). Since these firms need cash to finance their growth and invest in profitable projects, it is in VC investors' (with post-IPO equity ownership) interest to monitor cash holdings and ensure they are sufficiently high to finance future growth, and unexpected profitable investment opportunities which would contribute to firm value. Overall, the following hypothesis emerges:

*Hypothesis 1: Cash holdings are expected to be **negatively** related to **PE** voluntary ownership but **positively** related to **VC** voluntary ownership.*

In addition, I examine PE and VC investors' monitoring role of cash reserves in the post-flotation period and its impact on the long-run, aftermarket performance. A growing stream of literature examines the contribution of cash holdings to firm value. Pinkowitz *et al* (2006) find the relationship between firm value and cash holdings to be significantly weaker in countries with poor investor protection. In addition, the value of cash holdings differs with firms' corporate governance (Dittmar and Mahrt-Smith, 2007). More recently, Chen *et al* (2012) examine the link between the value of cash reserves and an exogenous analyst coverage reduction. They find that the market values cash less in firms which experience an exogenous analyst's coverage decline in anticipation of future agency problems (i.e. misuse of cash reserves).

In line with previous studies (e.g. Krishnan *et al*, 2009; Cao, 2011), I expect PE and VC investors to remain active monitors and create value in their portfolio firms post-flotation. I hypothesize that financial sponsors are directly interested in monitoring and mitigating agency problems associated with cash reserves even during the post-flotation period because of their high proportion of unrealized returns at the IPO date and concern for reputation. Hence, this leads to the following "Monitoring" hypothesis:

*Hypothesis 2: Cash is valued more by the market when financially sponsored IPOs hold more cash **if** PE and VC investors reduce agency conflicts by monitoring cash reserves.*

Overall, this paper combines the following two literature streams. First, I contribute to the set of studies (Bates *et al*, 2009; Dittmar and Mahrt-Smith, 2007) which reports growing cash holdings of US firms and their declining value to shareholders by directly examining whether PE and VC investors contribute to the phenomenon of increasing cash reserves. The second set of studies report the effectiveness of institutional investors in monitoring managers' actions (Cronqvist and Fahlenbrach, 2009; Krishnan *et al*, 2011). I contribute to this literature by assessing whether pre-IPO financial sponsors are active monitoring agents in the post-flotation period, who are able to reduce agency conflicts and thereby improve the firm's long-run performance. In sum, I combine these two literature streams and focus on the effect of PE and VC ownership on corporate cash policy, and subsequent effect on IPO firms' performance.

4.3 Data and Methodology

4.3.1 Sample and Data Sources

The sample includes all non-financial backed IPOs floated on the US stock markets (NYSE and Nasdaq) between 1997 and 2010. Thomson One Banker's ownership coverage begins in 1997, and I consider three year post-flotation long-run performance, thus the need to stop my sample in 2010. To classify financially sponsored IPOs into PE and VC samples, I use the study by Liu and Ritter (2011) and SDC Platinum database. The final sample consists of 446 PE-backed, 900 VC-backed

and 576 non-financially sponsored IPOs. I define cash holdings as cash and short-term investments over total assets.[76]

Ownership data of various groups of shareholders around the IPO date is manually collected from individual IPO prospectuses, which are gathered from Perfect Filings. I use Thomson One Banker to collect three years post-IPO ownership data, PE and VC fund and firm reports. I gathered 1727 PE and VC fund detailed reports from Thomson One Banker, which provide coverage of 869 US financially sponsored IPOs. IPO prospectuses are also used to gather the following information: names of PE and VC firms, lockup agreements data, management and institutional ownership around the IPO date, offer price, market of quotation and underwriter name. Post-IPO accounting data is downloaded from COMPUSTAT database, while stock prices and indices are gathered from DataStream.

4.3.2 Baseline Model Specification

Throughout the multivariate analysis, I differentiate and examine separately the effects of financial sponsors' ownership retention immediately after the lockup expiration date and annual ownership holdings during the three years post-flotation. The two types of ownership retention should be treated separately due to several reasons. PE and VC investors' ownership adjustments immediately after the lockup expiration are influenced by several factors such as the pressing need to make distributions to limited partners, IPO firm characteristics, and the market's reaction. The lockup expiration presents the first opportunity (following the admission) for PE and VC syndicates to realize a substantial part of returns.[77] This decision is purely governed by PE/VC investors' interests and no longer influenced by the investment

[76] For robustness checks the following alternative cash ratio definitions are used i) cash and short-term investments over sales ii) cash and short-term investments over net assets.

[77] Megginson and Weiss (1991) report that the majority of VC investors do not sell any of the firm's shares at the IPO date. Hence, for some VC syndicates, the unlock day represents the first opportunity to realize returns on investment.

bank, which on average limits pre-IPO investors' ability to sell shares for 180 days in the US (Brav and Gompers, 2003).

In addition, the market pays particular attention to ownership adjustments made immediately after the lockup expiration. Field and Hanka (2001) find that firms experience significant negative abnormal returns around the unlock day when insiders disclose share sales on that day. This is especially the case for VC-backed firms, which in contrast to other firms exhibit a more aggressive divestment intensity. Moreover, financial sponsors still possess detailed, insider knowledge at the unlock day as a result of a recently conducted restructuring, which was initiated and conducted by PE and VC investors. Financial sponsors can still exert a significant influence on the firm's corporate policies and operations through their block equity holdings and representation on the board of directors. PE sponsors start to significantly reduce their representation on the board of directors only two years following the quotation (Furth and Rauch, 2014).[78]

In contrast to ownership adjustments at the unlock day, divestments conducted following the lockup expiration are regarded as natural divestment pursued by financial sponsors, who are known to have a limited holding period since funds operate under the fixed 10-year life. After the unlock day, financial sponsors' influence on corporate policies starts to slowly decrease as a result of their reduced ownership concentration, emergence of new block holders and activists, such as Carl Icahn, who are able to significantly influence the board's decisions.

To examine the relationships between financial sponsors' ownership and corporate cash reserves, I follow the model developed by Gao *et al* (2013) and

[78] Furth and Rauch (2014, p.14) report that "…the buyout funds… hold on to their final board seats until 3.36 years after the IPO."

supplement it with the following variables: PE and VC retention dummy, fund characteristics, financial constraints, industry and year fixed effects.

$$Log\ (Cash/Total\ Assets) = \beta_0 + \beta_1 Retention\ Dummy + \beta_2\ Bank\ Affiliated\ Dummy + \beta_3 Large\ Syndicate\ Dummy + \beta_4 Financial\ Constraints + \sum \beta_k\ (Control\ variables_k) + \varepsilon \quad (1)$$

In order to mitigate the outliers' influence and resolve problems associated with skewness, I use the logarithmic transformation of the cash ratio. According to the first hypothesis, I expect β_1 to be significant and negative (positive) for PE- (VC-) backed IPOs, which is driven by different growth opportunities of these firms.

I examine the impact of PE and VC fund characteristics on cash reserves of financially sponsored IPOs. Hellmann *et al* (2004) argue that bank-affiliated funds provide capital to ventures to establish relationships for future lending. Hence, an existing relationship with an investment bank through PE or VC funding alleviates (to an extent) the difficulty and/or costs associated with accessing external funding. On the one hand, this implies that IPOs backed by bank-affiliated funds would hold more cash as a result of a close relationship with a bank, which has previously provided them with additional cash reserves. On the other hand, IPOs backed by bank-affiliated PE/VC funds are likely to maintain a lower cash ratio than IPOs backed by financial sponsors with alternative ownership structures. This is driven by relatively easier access to external funding, and hence smaller incentive and need to hold low return assets (i.e. cash) on their balance sheets. I expect a negative relationship between PE/VC fund's bank affiliation and cash reserves because of PE and VC investors' concern for high returns (i.e. negative β_2 coefficient). In addition, this effect is likely to be more prevalent in PE-backed IPOs than VC ones as they benefit more from an

existing relationship with an investment bank as a result of a high debt ratio at the time of IPO.

Another important feature of a PE and VC syndicate is its size. Lasfer and Matanova (2013) report that the median syndicate size is one (two) member(s) in PE-(VC-) backed firms. Tastan *et al* (2013) find that the average (median) syndicate size is 6.83 (6.00) members in VC IPOs floated on the US stock markets. Syndicates are significantly larger in VC deals than in PE ones because of higher risks associated with young, growing and high-tech affiliated firms. Hence, by investing in a venture in larger syndicates, VC investors are able to share and reduce risk (Wright and Lockett, 2003). In addition, past studies find that syndicate members benefit from knowledge sharing (Brandler *et al*, 2002), ability to get access to investments in other geographic markets and second valuations (Lerner, 1994). However, large syndicates have some drawbacks such as the free-riding problem (Chemmanur and Tian, 2011), slow decision making process and inefficient communication (Wright and Lockett, 2003). Hence, in this paper I use large syndicate dummy as a proxy for the portfolio firm's riskiness, and expect IPOs backed by larger syndicates to hoard more cash in order to avoid experiencing a sudden cash flow shock (i.e. positive β_3 coefficient).

Another important variable which affects corporate cash reserves is financial constraints. In imperfect capital markets, companies face transaction costs associated with raising external funding. Firms may hoard cash in order to minimize these costs and be in position to invest in profitable projects, which may arise in the future. This is especially the case for financially constrained firms, those with volatile cash flows and positive NPV investment opportunities. In contrast, financially *un*constrained firms have a significantly smaller incentive to save cash because of their easier access to external funding and resulting greater ability to invest in profitable projects

anytime. Hence, financial constraints could have a positive effect on corporate cash reserves.

On the other hand, financial constraints can negatively affect cash holdings. A large cash pile on the balance sheet attracts negative market's attention because of its low return and the possibility of being misused by managers, which negatively affects firm value. Harford *et al* (2008) report that managers in firms with weak corporate governance are prone to waste cash on unnecessary capital and acquisition expenditures. The firm could be targeted by activists, who are able to significantly influence boards' decisions and corporate policies, such as return cash to shareholders in the form of dividends and/or share repurchases.

However, in contrast to non-backed companies, financially sponsored IPOs have a pre-IPO block holder (i.e. PE/VC syndicate) with significant board representation, whose final return is highly dependent on the firm's share price at their full exit post-flotation. From PE and VC investors' prospective, the emergence of an activist as the firm's shareholder can be very undesirable since the share price fluctuates greatly during the board's and activists' negotiations. This, in turn, makes it more challenging for PE and VC investors to favourably time (in terms of share price) their full exit after the flotation. Hence, in order to avoid any additional market scrutiny, I argue that PE and VC can use the existing firm's financial constraints as a disciplinary mechanism for managers. Past studies demonstrate that being financially constrained benefits the firms' innovations (Almeida *et al*, 2013). By minimizing cash reserves in financially constrained firms, financial sponsors force managers to be very selective in the projects they invest in. This is particularly important for VC-backed firms, which in contrast to PE peers have more unstable cash flows, higher uncertainty and information asymmetries as a result of the high-tech nature. These firms'

characteristics make it easier for managers to accumulate and misuse cash, whereas financial constraints can force firms to make optimal decisions.

These arguments suggest that financial constraints have negative impact on cash holdings of PE- and VC-backed IPOs (i.e. negative β_4 coefficient). I use the following three measures of financial constraints: Whited and Wu (WW) index, Kaplan and Zingales (KZ) index and dividend payout ratio.[79] Previous studies suggest using a function of various firms' fundamental characteristics as a measure of financial constraints. For example, Kaplan and Zingales (1997) use cash flow, investment opportunities, leverage, cash dividends and cash holdings; while the index developed by Whited and Wu (2006) utilises cash flow, dividends, long term debt, firm size, sales growth and industry sales growth. The indices' specifications and constructions are discussed in more detail in the Appendix. Firms with higher WW and KZ indices' values are more financially constrained. In addition, I use a firm's payout as an additional measure of financial constraint. Firms which are able to commit to paying dividends in the long-run are most likely to have enough internal funds and be less financially constrained.

In line with Gao *et al* (2013), I use a number of other control variables in Model (1). An important variable of interest is market-to-book ratio, which I use as a proxy for growth opportunities. According to these arguments, I expect firms with higher growth opportunities to hoard more cash. This is particularly the case for VC sample, for which external funding is costly as a result of high information asymmetries between the firm's insiders and outsiders (Myers and Majluf, 1984). Firm size is likely to significantly affect cash reserves. On the one hand, its effect

[79] Farre-Mensa and Ljungqvist (2014) report that widely used measures of financial constraints (including the Whited and Wu and Kaplan and Zingales index) perform poorly in identifying constrained companies. Although the proxy variables are not efficient in light of the new evidence, there is no alternative so far which could capture behaviour of unconstrained and constrained firms.

could be positive to reflect the fact that investment opportunities require higher internal funds (Opler *et al*, 1999). On the other hand, larger firms might hold less cash as a result of economics of scale (Miller & Orr, 1966). Cash flow variables is included in the analysis in order to assess whether cash accumulation is a result of higher cash flows. Net working capital represents a cash substitute, which is expected to have a negative coefficient (Kim *et al*, 1998). Antunovich (1996) argues that firms with higher information asymmetries, such as those with high R&D expenses, hold more cash reserves because they are likely to have greater difficulty accessing capital markets.

In line with Harford (1999), I expect capital and acquisition expenditure to have a negative effect on cash reserves. Michaely *et al* (1995) report that dividend omissions announcements are accompanied by an average share price decrease of 7%. Hence, I expect dividend paying backed firms to save cash to protect themselves from a sudden cash shortfall, which could deteriorate the firm's ability to continue paying dividends. Debt repayments are usually done from cash reserves, and hence, I expect leverage to have an impact on cash reserves. I expect firms with higher sales growth and older firms to hoard less cash, as they could get internal funding from future sales and they are more known and transparent for outsiders. In addition, I include industry and year effects in the model.

In addition, I examine whether post-IPO ownership retention by financial sponsors mitigates agency problems and allows firms, particularly when they are financially constrained, to hoard cash by adding the interaction variable *Financial Constraint*Retention Dummy* (β_5) in the above model. According to the proposed hypotheses, I expect the coefficient β_5 of the interaction term to exhibit a significant positive effect.

In addition, I examine whether the presence of PE and VC investors post-flotation has an impact on financial constraints. More specifically, I expect PE and VC equity ownership to alleviate financial constraints. The extant literature reports that VC investors certify an issue by effectively conveying credible information about the firm. Similarly, Mogilevsky and Murgulov (2012) report that PE-backed IPOs exhibit lower underpricing than non-financially sponsored IPOs. Hellmann *et al* (2004) report that banks provide VC funding in order to develop relationship with firms, which are likely to need debt in the future. These arguments suggest that PE and VC investors' continued post-IPO presence alleviates financial constraints. This could either be achieved by reducing costs associated with accessing external funding[80] or/and the level of information asymmetries. Therefore, this yields the following predictions, which I test my means of a univariate analysis: (i) Backed IPOs with higher PE and VC ownership have significantly lower financial constraints than those with lower PE/VC ownership. (ii) Backed IPOs experience a significant increase in financial constraints following PE and VC investors' full exit post-flotation.

To investigate the performance drivers of financially sponsored IPOs and shed light on whether the market values cash more in firms where financial sponsors retain ownership, I run the following model:

$$\textit{Three-year Market-Adjusted BHARs} = \beta_0 + \beta_1 \textit{Retention Dummy} + \beta_2 \textit{Industry-Adjusted Cash Ratio} + \beta_3(\textit{Industry-Adjusted Cash Ratio*PE/VC Retention Dummy}) + \sum \beta_k (\textit{Control variables}_k) + \varepsilon \quad (2)$$

[80] For example, some PE and VC funds are bank affiliated (i.e. the holding company of PE and VC fund/house is a bank). An existing relationship with a bank (through PE or VC funding) could facilitate IPO firm's access to debt financing.

All accounting independent variables, management and institutional ownership data are taken from the first annual report post-flotation. The above specification allows me to examine the unconditional effect of cash (β_2) on the long-run stock performance of PE- and VC-backed IPOs, whereas β_3 captures the conditional (on financial sponsors' ownership retention) cash effect on the dependent variable. According to the "Monitoring" hypothesis, I expect β_3 to be positive and statistically significant. This effect is likely to be more pronounced in PE-backed IPOs since these firms are more prone to agency conflicts as a result of their fundamental firm characteristics, and post-IPO presence of PE investors is likely to mitigate this conflict. Hence, the market is likely to value cash more in these firms, in comparison to VC sample, which have high growth opportunities and cash is less likely to be misused but rather spent on growth and investment opportunities.

In Model (3), the following control variables are included in line with prior literature: first day return, size, market-to-book, leverage, PE/VC lockup duration, underwriter reputation, management ownership, institutional block holders' ownership, PE dummy, firm age, industry and year dummies.

4.4 Empirical Results

Table 1 and Figure 1 report the annual distribution of the cash ratio for financially sponsored and non-backed IPOs. Cash holdings of non-backed and VC IPOs experienced noticeable peaks during the dot-com bubble and in 2009. In 1999, non (VC)-backed IPOs held on average 62% (57%) of their assets in cash, and in 2009 the average cash ratio equaled 46% (73%) respectively. The annual distribution of PE-backed IPOs' cash reserves is more stable with an upward trend which has

reached its highest level of 20% in 2010. However, it's important to note that during the sample period the average cash ratio of PE-backed IPOs doubled from 10% to 20%. Within financially sponsored IPOs, VC-backed IPOs on average held a higher proportion of assets in cash compared to PE sample throughout the sample period.

Panel B presents descriptive statistics of cash holdings of US IPOs around the year of quotation. On average, PE-backed IPOs hold the lowest proportion of assets in cash pre-flotation (10%), followed by non-backed (41%) and VC (54%) IPOs (Panel B). This provides a great motivation to investigate the reasons behind such a discrepancy. After the IPO, cash holdings of non-backed firms decrease significantly from 43% to 31%, whereas that of financially sponsored firms remained relatively stable. During the four year time window around the IPO year, the cash ratios of VC and PE samples differ significantly and by the end of the third year post-flotation the VC sample holds 57% of their assets in cash, in contrast to PE IPOs' cash ratio of 15%; the *t* of difference in means is -7.95.

On average, companies in high-tech and healthcare industries hold the highest proportions of assets in cash, while durables and non-durables industries hold the least cash reserves as shown in Panel C. This applies to both non-backed and financially sponsored IPOs. As before, on average PE-backed IPOs maintain the lowest cash reserves followed by non-backed and VC samples, which applies to all industries.[81] I find that VC-backed IPOs maintain significantly higher cash ratios than PE IPOs in all industries (except for the energy sector), suggesting that the significant difference between cash holdings of VC and PE samples are not driven by a single industry. Moreover, this finding provides preliminary insight into the fact that fundamentally

[81] Consistent with prior literature, I excluded IPOs which operate in a highly regulated utility industry from the sample.

different firm characteristics of PE and VC sample are the drivers of corporate cash reserves.

Panel D reports summary statistics for exited and retained backed IPOs. 'Retained' and 'Exited' classification is based on whether PE and VC syndicates have fully exited or retained some shares immediately after the lockup expiration date. This event represents the first opportunity for PE and VC syndicates to choose how much of their equity stake to retain. This decision is purely governed by PE and VC interests and no longer influenced by the investment bank, since the period is above the average of 180 days. I find that retained VC IPOs hold significantly higher cash reserves than their exited peers, whereas cash holdings of PE-backed IPOs are more homogeneous. The differences in means and medians suggest that VC-backed IPOs have significantly higher cash ratios than PE IPOs, regardless of whether backed IPO are retained or exited by financial sponsors. In Appendix, I present the descriptive statistics using alternative definitions of cash ratio.[82] The results remain the same.

[Insert Table 1 and Figure 1]

Table 2 provides summary statistics of non-backed, PE- and VC-backed IPOs. On average, financially sponsored IPOs differ from the non-backed sample along all the considered IPO firm characteristics (Panel A). I will concentrate on the differences within backed IPOs since it is the focus of the proposed hypotheses. PE-backed IPOs' industry-adjusted cash reserves summary statistics reveal that they maintain relatively similar cash ratio to their public industry peers, whereas the cash ratio of VC-backed IPOs is, on average, 36% higher. PE-backed firms are significantly larger (total assets of $783.86mil versus $69.78mil), and more levered (debt ratio of 71% versus 23%), in line with prior studies (Levis, 2011). They also have higher acquisition expenditures

[82] In the Appendix, I use the following two alternative definitions of the cash ratio: i) cash and short-term investments over sales ii) cash and short-term investments over net assets.

and cash flows than VC-backed IPOs. As expected, VC firms have higher R&D and capital expenditures pre-flotation, more are high-tech and quoted on the Nasdaq market, and they are considerably younger than PE-backed IPOs (6.63 and 28.58 years, respectively), implying that they are much more likely in the start-up stage of their business cycle.

I find that backed IPOs differ significantly in terms of IPO firm ownership structure and syndicate characteristics. Managers of VC-backed IPOs hold significantly a higher proportion of outstanding shares of 33.68% in the pre-flotation period, compared to 27.49% for PE firms. Hence, venture capitalists use managerial equity ownership significantly more than PE investors to align the interests of managers and those of shareholders more closely in young, high-tech and growing firms.

In contrast, institutional pre-IPO investors' ownership of 6.86% in PE IPOs is significantly higher than 4.47% in VC-backed flotations (the *t* of difference in means is -2.85). A quarter of PE and VC syndicates divest completely after the unlock day,[83] while in 75% of deals financial sponsors retain some shares. The significantly larger syndicate size in VC deals reflects venture capitalists' effort to share and reduce risk associated with supporting young, high-tech and growing ventures. For example, the median syndicate size in VC deals is four members, compared to just two in PE IPOs. Moreover, 7.07% (15.88%) of VC (PE) IPOs are backed by a lead syndicate member

[83] It is not viable at the moment to examine PE and VC firms' ownership adjustments made on the exact date of lockup expiration. Thomson One Banker provides ownership data in March, June, September and December. For that reason, the first Thomson One Banker ownership quarter *after* the unlock day is used for the purpose of this analysis. For example, the IPO date of Curon Medical Inc is 9/22/2000. 180 day lockup period expires on 3/21/2001. Hence, the date of the first Thomson One Banker quarter post lockup expiration is 3/31/2001.

which is bank-affiliated.[84] PE-backed IPOs are also more financially constrained than VC IPOs based on the KZ Index (Panel C).

[Insert Table 2]

Table 3 presents the average equity ownership by PE and VC syndicates before and after the flotation. Consistent with previous studies (Levis, 2011; Cao, 2011), PE investors hold significantly higher ownership concentrations in the pre-flotation period of 69.72%, compared to 50.49% for VC syndicate. Block equity holdings allow financial sponsors to make intensive restructuring activities without the scrutiny from the market, and exert significant influence on managers and the board of directors. Financial sponsors pursue a stable divestment strategy by selling around 33-36% of their last period's equity ownership each year. Even three years post-flotation, PE investors still maintain significantly higher holdings than venture capitalists (13.71% versus 7.75%).

[Insert Table 3]

Table 4 reports the aftermarket performance of PE- and VC-backed IPOs. Panel A shows that the average first day returns of PE-backed IPOs range between -13.64% and 5.09%. One year post-flotation, there is weak evidence that retained cash rich IPOs outperform their exited peers. However the situation dramatically changes thereafter, as the performance of PE-backed IPOs deteriorates. By the end of the third year, the average long-run returns range from -23.97% to 1.69% for various PE sub-samples.

[84] I focus on the lead syndicate fund's characteristics. Following the extant literature (Krishnan *et al*, 2011; Lin and Smith, 1998; Hochberg *et al*, 2007), a lead fund is defined as the one which holds the highest percentage of the firm's outstanding shares immediately pre-quotation. In case the lead fund's characteristics are not available, I consider the fund with the second highest equity ownership. Krishnan *et al* (2011) examine lead and non-lead syndicate members, and conclude that lead funds hold significantly more shares and boards seats, which continues in the post-flotation period.

Panel B shows that the average first day return of VC-backed IPOs varies from 14.45% to 52.03%. The significantly higher underpricing of VC, compared to PE IPOs, is consistent with the conventional wisdom that more risky firms (high-tech, young, R&D intensive and Nasdaq quoted) are more underpriced. Within VC cash poor firms, I find a significant variation in first day return: retained IPOs are significantly more underpriced than exited peers. Hence, financial sponsors fully exit soon after the unlock day less risky and IPOs with lower information asymmetries. Overall, Panel B shows that the first day return fluctuates greatly with respect to the level of cash and whether financial sponsors fully divested after the unlock day.

Moreover, IPOs where VC exited significantly outperform their retained peers in the aftermarket in both cash rich and cash poor samples. The last two columns are of particular interest since they are directly related to the proposed hypotheses. More specifically, I find that within retained VC sample, IPOs with higher cash reserves outperform their peers, implying that cash availability allows firms to make positive NPV projects and to generate value. Within the exited VC samples, it's not surprising that I do not find any significant differences (last column) because both samples do not longer have a block equity shareholder who would oversee cash reserves and thereby positively contribute to the long-run performance.

Overall, Table 4 documents two additional trends for PE and VC samples. There is evidence of overreaction in the market since sub-samples with a higher first day return perform worse in the aftermarket. Secondly, the best performers are cash poor IPOs which are fully exited by financial sponsors, which suggest that when there are no monitoring agents such as PE and VC firms, IPO companies are better off minimizing the cash reserves, which could be easily misused by managers.

The VC long-run returns in Table 4 are roughly consistent with Ritter (2013), while PE-backed IPOs' results somewhat differ. This difference could be driven by different sample periods analyzed since it has been widely acknowledged that the underpricing is highly cyclical, and the aftermarket performance is affected by high-volume years (Ritter, 1991). As a robustness check, I present descriptive statistics of long-run stock returns exclusive of 384 VC- and 67 PE-IPOs listed during the bubble period (i.e. January 1999 - December 2000) in Appendix. The results remain similar.

[Insert Table 4]

Table 5 sheds light on the primary drivers of corporate cash reserves. In Panel A, I investigate the individual effects financial sponsors' equity retention, fund characteristics and financial constraints on cash holdings. Within financially sponsored companies, PE-backed firms hold significantly less cash (Model [1] and [2]), which is in line with univariate statistics reported in Table 1. I find that financial sponsors' post-IPO equity ownership has significant explanatory power, which provides support for the proposed hypothesis (Model [3]-[6]). More specifically, I find that continued venture capitalists' involvement in firms has a statistically positive effect on VC firms' cash reserves, while voluntary equity holdings of PE investors have a negative impact on cash reserves. In addition, the positive coefficient of the market-to-book ratio suggests that VC firms with greater growth/investment opportunities hoard more cash, which is consistent with my expectation.

As predicted, I find that cash reserves of PE-backed IPOs to be negatively affected by PE fund's bank affiliation, in line with Hellmann *et al* (2004), who report that banks provide VC financing to develop new relationships for future loan facilities. As a result of an existing relationship with an investment bank (via PE financing) and easier access to capital markets, IPOs backed by bank affiliated PE

funds retain a lower proportion of cash on their balance sheets. Financially sponsored IPOs backed by larger syndicates maintain higher cash reserves post-flotation. Since syndicate members have an incentive to realize the highest possible return on their retained equity stake, their cash reserves are likely to act as a buffer against a sudden cash flow shock in risky portfolio firms. This is in line with the precautionary motive.

The results indicate that while cash flows, R&D, dividend payment and leverage exert positive effect on cash reserves of US floated backed firms, size, net working capital, capital and acquisition expenditure, sales growth and firm age have a negative effect. The cash reserves of backed IPOs are partly explained by the economies of scale ('transaction motive') since the results in Panel A suggest that larger firms hold less cash. In line with Antunovich (1996), I find that more R&D intensive firms hoard more cash because they face higher information asymmetries and are likely to have greater difficulty accessing capital markets.

The agency theory predicts that larger and more established firms (i.e. PE) are more likely to face agency problems of free cash flow, leading, in turn, to an increase in corporate cash reserves. The results in Panel A suggest that this is indeed the case as the coefficients of cash flows are larger and more significant for PE-backed IPOs than for VC peers. Net working capital is also negatively related to cash holdings, implying that, in line with the substitution effect, firms face less need to hoard cash in case they have high net working capital, which can be easily and quickly transformed into cash. In addition, younger firms maintain higher cash ratios, which could be explained by the markets' limited knowledge of these firms, which could result in more difficulties and higher costs associated with accessing external markets.

As expected and given the fundamental differences between PE and VC-backed IPOs, I find that dividend payment dummy and capital expenditures solely

drive PE-backed firms' cash reserves. More specifically, PE portfolio firms with higher capital expenditures hold less cash, whereas dividend paying PE firms hoard more cash. Michaely *et al* (1995) report that dividend omissions announcements are accompanied by an average share price decrease of 7%. Hence, dividend paying PE-sponsored firms save cash to protect themselves from a sudden cash shortfall, which could deteriorate the firm's ability to continue paying dividends. Overall, fundamental PE and VC portfolio firm characteristics have significant impact on the drivers of cash reserves, and lead to VC (PE) post-IPO equity retention to have a positive (negative) effect on VC (PE) firms' cash reserves. Also, cash reserves of PE- and VC-backed IPOs are partly explained by transaction, precautionary and agency theories.

Panel B presents multivariate analysis of corporate cash reserves. I examine whether PE and VC syndicate retention has a significant impact on the relation between financial constraints and cash reserves. Although the financial constraint variable by itself has a statistically negative impact on cash of VC-backed IPOs, the coefficient of the interaction variable (financial constraint index WW*Retention) is statistically positive for VC sample at 1% level. These results suggest that venture capitalists' post-IPO ownership retention allows financially constrained firms to hoard cash.

The results in Panel B confirm that larger and more established firms (i.e. PE-backed IPOs) are more prone to agency problems and hence financial sponsors require low cash levels. In contrast, VC investors ensure that their IPOs have enough cash to finance their future growth and investment opportunities. As a robustness test, I replicate Table 5 (Panel A and B) using the following two alternative measures of the cash ratio in Appendix: i) cash and short-term investments over sales ii) cash and short-term investments over net assets. The results remain unchanged.

In Panel C and D, I examine the extent to which PE and VC voluntary retentions have an impact on cash reserves in financially constrained and unconstrained firms. Financially sponsored IPOs are classified into 'Unconstrained' and 'Constrained' firms every year. Following Lamont *et al* (2001), I rank all firms based on WW (and KZ) index each year. I assign the top 33% of firms as 'constrained', and the bottom 33% as 'unconstrained.' I rank PE and VC samples separately based on the two indices each year. Based on the dividend payout ratio, firms are classified each year as 'unconstrained' if a firm pays dividends, and 'constrained' in the case a firm does not pay dividends.

Panel C indicates that PE investors' *post-IPO annual equity holdings* have a statistically negative impact on cash reserves of both financially constrained and unconstrained firms. In contrast, Panel D shows that for VC sample, the *ownership retention immediately after the unlock day* matters for cash reserves in constrained and unconstrained firms. The statistically significant different proxies for PE and VC continued engagement could be attributed to agency problems. In PE-backed IPOs, which are more prone to such problems, the continuous post-IPO engagement of financial sponsors matters the most. Overall, the results suggest that financial sponsors' continued involvement in financially constrained and unconstrained portfolio firms mitigates agency problems.

[Insert Table 5]

Table 6 tests whether PE and VC investors play an important role in alleviating financial constraints in portfolio firms. Panel A presents the evolution of financial constraints pre- and in the post-flotation period for backed IPO with high and low financial sponsors' ownership concentrations. Panel A shows that backed firms with higher PE and VC ownership concentrations face significantly lower

financial constraints than those with lower PE and VC ownership.[85] Moreover, Panel B reports that PE and VC firms become more financially constrained as more time passes from the IPO year.

Panel C reports the summary statistics of financial constraints' levels around the year of PE and VC syndicates' full exit post-flotation. After financial sponsors' full exit (which takes place one year after IPO), firms experience a significant increase in financial constraints: the average KZ index before the full exit is -1.67, which increases to 0.02 following financial sponsors' full exit. Similarly, 56.28% of firms are financially constrained (based on payout ratio) before the full exit, which significantly increases to 85.06% post full exit. It's interesting to note that financial constraints do not experience a significant increase when PE/VC syndicates exit fully in the 2nd or 3rd year post-flotation, suggesting that the market views financial sponsors' divestment dynamics during the first year of flotation to be the most important. In sum, the results in Table 6 indicate that the post-IPO continued ownership of PE and VC investors alleviates backed IPOs' financial constraints.[86]

[Insert Table 6]

I examine the drivers of corporate cash policy in financially sponsored IPOs, and more importantly whether the market values cash more in firms with post-IPO financial sponsors' ownership. It's of a particular interest to examine the impact of cash on the long-run performance of *financially sponsored* IPOs in light of recent papers documenting ballooning cash holdings of US corporations. Backed IPOs represent a distinctive class of companies with lower information asymmetries (Megginson and Weiss, 1991), better corporate governance (Cornelli and Karakas,

[85] Except for WW index results for PE-backed IPOs, which indicate that IPOs with lower PE ownership have lower financial constraints.
[86] In the Appendix, I present median financial constraints statistics.

2010; Lerner, 1995; Baker and Gompers, 2003), as well as stronger alignment of shareholders' and managers' interests (Baker and Wruck, 1989).

Table 7 provides the multivariate analysis of the long-run performance. Cash reserves have statistically negative impact on the performance of PE-backed IPOs, whereas no significant effect on performance of VC peers. Hence, PE firms are indeed more prone to agency problems, and cash is easily misused by managers in these firms. In contrast, in line with my expectations I find that the cash coefficient is positive, although not significant for the VC sample.

The significant positive coefficient of the interaction variable (i.e. industry-adjusted cash ratio*PE Retention) suggests that the continued equity involvement of PE investors mitigates agency problems associated with cash reserves, and positively affects the firm's long-run performance. Hence, the market values cash more in firms with higher PE investors' post-IPO ownership, which provides support for the monitoring hypothesis. Therefore, PE investors are important monitoring agents in the post-quotation period. In addition, I find that larger PE-backed IPOs perform better, whereas those underwritten by global underwriters perform worse. The long-run performance of VC-backed firms is positively driven by size and firm age.

[Insert Table 7]

As a robustness test, I use a different methodology based on changes in the explanatory variables to confirm that cash is valued more in companies with retained PE investors' involvement. I replicate the model used in the study by Faulkender and Wang (2006) with an addition of PE and VC retention dummy, in which all the accounting values used, except for leverage, are scaled by market capitalization in the previous fiscal year. Panel A presents post-IPO accounting characteristics' summary statistics. Backed IPOs demonstrate negative average industry-adjusted annual excess

stock returns three years post-flotation, in line with Ritter (2013). On average, cash holdings of sponsored IPOs increase in the post-IPO period, but VC-backed IPOs continue to hold significantly higher proportion of cash compared to PE-backed IPOs.

In Panel B, I run the model for retained and exited companies separately to compare the drivers of their long-run performance. The marginal value of cash is higher in retained PE-backed than in exited PE IPOs: shareholders of retained PE-backed firms value an extra dollar of cash at $1.70 (statistically significant at 5% level), whereas only at $0.72 (not statistically significant) in exited IPOs. This finding suggests that PE investors can positively contribute to the long-run performance by means of alleviating agency conflicts and continuous support and monitoring of portfolio firms. Interestingly, $\Delta Cash_t$ coefficient in retained PE IPOs is higher than the one reported by Faulkender and Wang (2006) for US public firms. In their study, the authors report (p.1972) "the estimated marginal value of cash for a firm with zero cash and no leverage is $1.47." This provides additional support for the fact that PE investors' post-PO presence is beneficial for other shareholders in creating value. Overall, the results are consistent with Table 7.

The results in Table 8 indicate that the marginal value of cash in retained financially sponsored IPOs is sensitive to lagged firms' cash reserves and leverage. I find that the value of an extra dollar of cash in *retained* IPOs decreases with the level of cash reserves and leverage, as $Cash_{t-1}*\Delta Cash_t$ and $Leverage_t*\Delta Cash_t$ are negative, in line with Faulkender and Wang (2006). However, exited backed peers are not sensitive to these variables. According to the extant literature on contingent claims analysis (Black and Scholes, 1973; Merton, 1973), debt holders hold a very high proportion of firm value in highly levered companies. Hence, an additional dollar of cash in retained backed IPOs primarily go to increasing debt value. As a result, the

equity market values less an increase in cash holdings in highly levered firms, since equity holders do not benefit from a larger cash pile. In contrast, *exited* backed peers are likely to converge to their industry peers much quicker that retained companies. For example, Levis (2011) finds that PE-backed IPOs' leverage becomes almost identical to the one of industry peers within the first year of flotation. Hence, I do not find a statistically significant relationship between exited IPOs' firm value and $Leverage_t * \Delta Cash_t$ coeffcient. In conclusion, I contribute to the literature by reporting that the marginal value of cash holdings is sensitive to the level of cash and leverage in retained backed IPOs, while it's insensitive to these factors in backed exited peers.

[Insert Table 8]

4.5 Additional Robustness Checks

I use instrumental variables approach to address the endogeneity concern to check the robustness of the finding that PE and VC ownership retention alleviates the agency costs in backed IPOs thereby allowing financially constrained firms to hoard cash. I use as instrument PE (VC) retention by PE house age (underpricing), which presumably affects the financial sponsors' retention post-IPO without depending on the level of cash. Table 9 presents the results of the first stage and the two-stage least-squares estimation. The results of Model [1] and [3] suggest that both instrumental variables have a strongly positive association with the retention variable, which imply that the chosen instruments are appropriate. The results of the two-stage least-squares estimation support earlier results: VC's voluntary presence post-flotation alleviates the agency costs associated with cash reserves, thereby allowing managers to hoard cash in financially constrained firms.

[Insert Table 9]

I use the same methodology to address the endogeneity concern with respect to the finding that post-IPO PE investors' equity guarantees the monitoring of corporate cash reserves, which results in alleviation of agency conflicts and higher market value of cash. I use as instrument PE (VC) retention by low proximity dummy (syndicate size), which presumably affects the financial sponsors' retention post-IPO without depending on the firm's aftermarket performance. The results of the endogeneity test are presented in Table 10. The choice of instrumental variables is judicious since they are both strongly associated with PE/VC post-IPO equity retention (Model [1] and [3]). The two-stage least-squares estimation results provide support for my earlier findings.

[Insert Table 10]

4.6 Conclusion

A growing stream of literature focuses on ballooning cash holdings of public and private firms (Bates *et al*, 2009; Gao *et al*, 2013), and concludes that corporate governance and investor protection have significant effects on the value of cash reserves (Pinkowitz *et al*, 2006; Dittmar and Mahrt-Smith, 2007). However, there are no studies to date that examine the impact of PE- and VC-backed IPOs' on cash holding and its impact on firm value.

Private equity and venture capital investors provide capital, certification (Megginson and Weiss, 1991), conduct intensive restructuring (Baker and Wruck, 1989; Acharya *et al*, 2009) and monitoring of their portfolio firms (Jensen, 1986; 1989), which ultimately result in backed firms' improved operating and financial performance. Although financial sponsors make significant adjustments to their ownership at the IPO date (Barry *et al*, 1990; Cao 2011), a large proportion of them

remain active investors in the post-flotation period by means of large equity holdings. Hence, these investors are incentivized to continue monitoring and shaping corporate polices in the post-flotation period.

I contribute to the existing literature by analyzing the drivers of backed IPOs' cash reserves. I present evidence that VC-backed IPOs maintain significantly higher cash reserves than PE-backed IPOs in all industries. I examine the impact of financial sponsors' ownership retention, financial constraints and PE/VC fund characteristics on corporate cash holdings of backed IPO. I report that the fundamental firm characteristics of backed firms (especially growth opportunities) are significant drivers of corporate cash reserves. I find that several existing theories (transaction, precautionary and agency) partly explain cash reserves of financially sponsored IPOs. After accounting for all the control variables, I find that VC IPOs with retained venture capitalist' ownership have significantly higher cash reserves than their exited peers, thereby providing support for the proposed hypothesis. In contrast, post-IPO equity ownership by PE investors reduces the firm's corporate cash reserves, which is consistent with the agency theory.

I report that financial sponsors use portfolio firm's existing financial constraint as an additional disciplinary mechanism, which minimizes the cash level, potential misuse of resources, as well as forces managers to be very selective in the investment decisions. PE and VC investors' voluntary post-IPO equity retention allows financially constrained firms to hoard cash for future profitable investment opportunities. I find that PE and VC equity ownership alleviates financial constraints by reporting that following the financial sponsors' full exit post-flotation, firms become significantly more constrained financially.

PE and VC syndicate characteristics (PE/VC fund's bank affiliation and syndicate size) have a material impact on corporate cash reserves of US IPOs. I find that the fund's bank affiliation has significant negative impact of backed firms' cash holdings. In addition, I show that backed IPOs' cash holdings are sensitive to the syndicate size: more risky companies (i.e. those backed by larger syndicates) hold higher cash holdings post-flotation.

I test the monitoring hypothesis which predicts the market to value cash more in backed IPOs with continued financial sponsors' post-IPO ownership. The results indicate that continued PE involvement mitigates agency problems associated with cash holdings, which ultimately positively contributes to the aftermarket performance. Consistent with previous studies (Ritter, 1991; Levis, 2011), I report backed IPOs' long-run underperformance, and find weak evidence of market overreaction. In addition, I find that the marginal value of cash of *retained* backed IPOs is sensitive to the firm's initial cash holdings and leverage, whereas no such statistical effect is found for exited backed IPOs.

Overall, this paper demonstrates that financial sponsors have a significant impact on firms' post-flotation policies and performance. PE and VC investors with post-IPO equity ownership continue to closely monitor corporate cash reserves, setting it at value maximizing level given the portfolio firm's growth opportunities, thereby mitigating managerial expropriation and leading to better long-run stock returns.

An important implication of the presented results is that the market and outside investors should not be alarmed or penalize financially sponsored IPOs with continued PE and VC ownership for holding more cash. I provide evidence that financial sponsors are able to effectively monitor corporate cash reserves, and ensure

it is not misused by managers for their private benefits at the expense of shareholders. Hence, the involvement of activists with the sole purpose of increasing payouts to shareholders in firms with higher than average cash reserves will not be as effective for financially sponsored IPOs. In these firms, PE and VC investors are incentivized to monitor cash because they only lock-in a small part of their returns at the IPO date, whereas their final return is highly dependent on the firm's share price in the aftermarket.

In addition, limited partners should recognize that certain characteristics of PE and VC funding (i.e. fund's bank affiliation and syndicate size) has a significant effect on portfolio firms' corporate policies such as cash, which might not necessarily be in line with their investment principles. In conclusion, this paper contributes to the extant literature on the increasing US corporate cash reserves by documenting that financial sponsors contribute greatly to this phenomenon.

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Tables for Empirical Study 3

Table 1. Cash Ratio

The sample consists of 579 non-backed and 1,346 backed IPOs on the US stock markets from 1997 to 2010. Cash Ratio is defined as cash and short-term investments over total assets. "Backed IPO" are IPOs with private equity (PE) or venture capital (VC) investor listed as a major shareholder immediately before the flotation in prospectuses. 't' refers to the IPO year. *Panel A* presents the annual distribution of the cash ratio during the sample period. 'Obs.' refers to the number of available observations. Statistical significance of the difference in means and medians between various samples are reported by [a], [b] and [c], which denote statistical significance at the 1%, 5%, and 10% levels, respectively. In column [1], [a], [b] and [c], refer to the statistical difference between backed and non-backed IPOs ([1]-[2]). In column [3], [a], [b] and [c], refer to the statistical difference between PE-backed and VC-backed IPOs ([3]-[4]). *Panel B* shows the means and medians cash ratios for non-backed, PE- and VC-backed IPOs. For years t-1 and t=0, all non-backed and financially sponsored IPOs are considered. For t+1, t+2, t+3, mean and median cash ratios for all non-backed IPOS are presented, whereas for PE and VC IPOs only firms retained by financial sponsors in corresponding year post-flotation are considered in the analysis. *Panel C* shows the distribution of cash ratios by industry. *Panel D* reports the descriptive statistics of cash ratios of backed IPOs. In column [1], [a], [b] and [c], refer to the statistical difference between exited PE and VC IPOs ([1]-[3]). In column [2], [a], [b] and [c], refer to the statistical difference between retained PE and VC IPOs ([2]-[4]). "Retained IPOs" are IPOs in which PE/VC syndicates have maintained some ownership at first quarter post lockup expiration date, and "Exited IPOs" are firms in which PE/VC investors have sold all their equity stake at first quarter post lockup expiration date. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Annual Distribution of the Cash Ratio

Year	Backed IPOs [1]			Non-Backed IPOs [2]			PE-Backed IPOs [3]			VC-Backed IPOs [4]		
	Obs.	Mean	Median	*Obs.*	Mean	Median	*Obs.*	Mean	Median	*Obs.*	Mean	Median
1996	*94*	0.34[b]	0.15[c]	*86*	0.20	0.10	*21*	0.10[b]	0.03[a]	*73*	0.41	0.31
1997	*165*	0.34	0.27	*128*	0.30	0.16	*45*	0.07[a]	0.03[a]	*120*	0.44	0.40
1998	*330*	0.57	0.40[a]	*194*	0.43	0.21	*65*	0.08[a]	0.02[a]	*265*	0.69	0.48
1999	*456*	0.48	0.47[a]	*234*	0.62	0.28	*88*	0.12[a]	0.04[a]	*368*	0.57	0.59
2000	*424*	0.45[a]	0.40[a]	*213*	0.33	0.22	*96*	0.11[a]	0.05[a]	*328*	0.55	0.52
2001	*346*	0.43	0.40[c]	*135*	0.36	0.30	*99*	0.14[a]	0.08[a]	*247*	0.55	0.56
2002	*293*	0.39	0.37	*101*	0.38	0.31	*101*	0.15[a]	0.09[a]	*192*	0.52	0.54
2003	*275*	0.37	0.33	*75*	0.33	0.29	*114*	0.12[a]	0.06[a]	*161*	0.55	0.61
2004	*266*	0.32	0.20	*70*	0.28	0.17	*141*	0.11[a]	0.06[a]	*125*	0.55	0.60
2005	*329*	0.33[b]	0.18[c]	*84*	0.25	0.15	*177*	0.13[a]	0.07[a]	*152*	0.56	0.60
2006	*383*	0.36[b]	0.24[c]	*123*	0.29	0.14	*185*	0.13[a]	0.07[a]	*198*	0.57	0.60

2007	*346*	0.377[a]	0.32[a]	*118*	0.29	0.14	*160*	0.14[a]	0.07[a]	*186*	0.58	0.64
2008	*283*	0.43	0.24[a]	*105*	0.24	0.12	*140*	0.15[a]	0.08[a]	*143*	0.70	0.51
2009	*277*	0.49	0.30[a]	*103*	0.46	0.13	*122*	0.18[a]	0.09[a]	*155*	0.73	0.48
2010	*183*	0.44[b]	0.36[a]	*128*	0.29	0.16	*72*	0.20[a]	0.11[a]	111	0.60	0.51

Years around the IPO Year	**Non Backed IPOs** [1]		**PE-Backed IPOs** [2]		**VC-Backed IPOs** [3]		**Differences** [1]-[2]		[1]-[3]		[2]-[3]	
	Mean	Median	Mean	Median	Mean	Median	t-stat	MW	t-stat	MW	t-stat	MW
						Panel B. Cash Ratio						
t-1	0.41	0.15	0.10	0.05	0.54	0.45	*2.67***	*[0.00]*	*-1.30*	*[0.00]*	*-8.23***	*[0.00]*
t=0	0.43	0.30	0.16	0.08	0.59	0.67	*4.64***	*[0.00]*	*-3.65***	*[0.00]*	*-9.41***	*[0.00]*
t+1	0.31	0.21	0.14	0.08	0.56	0.59	*7.61***	*[0.00]*	*-12.32***	*[0.00]*	*-24.65***	*[0.00]*
t+2	0.28	0.17	0.15	0.08	0.57	0.54	*6.23***	*[0.00]*	*-6.70***	*[0.00]*	*-8.22***	*[0.00]*
t+3	0.81	0.19	0.15	0.08	0.57	0.53	*1.55*	*[0.00]*	*0.66*	*[0.00]*	*-7.95***	*[0.00]*
						Panel C. Cash Ratio Distribution by Industry						
Non-Durables	0.07	0.05	0.03	0.02	0.22	0.08	*1.72**	*[0.06]*	*-1.72**	*[0.25]*	*-2.42***	*[0.05]*
Durables	0.08	0.05	0.05	0.03	0.25	0.22	*0.62*	*[0.72]*	*-1.76**	*[0.51]*	*-1.98***	*[0.43]*
Manufacturing	0.10	0.04	0.06	0.03	0.43	0.35	*2.07***	*[0.11]*	*-3.56****	*[0.00]*	*-4.56****	*[0.00]*
Energy	0.12	0.06	0.07	0.06	0.11	0.07	*0.94*	*[0.90]*	*0.08*	*[0.41]*	*-0.90*	*[0.46]*
Hi-Tech	0.66	0.27	0.15	0.07	0.53	0.45	*1.20*	*[0.00]*	*0.62*	*[0.00]*	*-3.06****	*[0.00]*
Telecommunications	0.41	0.25	0.09	0.05	0.52	0.35	*2.12***	*[0.00]*	*-0.49*	*[0.41]*	*-1.96***	*[0.00]*
Shops	0.17	0.07	0.10	0.04	0.28	0.18	*1.28*	*[0.20]*	*-1.55*	*[0.03]*	*-3.45****	*[0.00]*
Healthcare	0.49	0.54	0.07	0.04	0.59	0.69	*6.18****	*[0.00]*	*-1.89**	*[0.10]*	*-8.79****	*[0.00]*
Other	0.45	0.09	0.12	0.06	0.61	0.36	*1.32*	*[0.04]*	*-0.46*	*[0.00]*	*-3.06****	*[0.00]*

Panel D. Cash Ratios of Retained and Exited Backed IPOs.

Years around IPO Year	PE-Backed IPOs						VC-Backed IPOs					
	Exited [1]		**Retained** [2]		**Differences** [1]-[2]		**Exited** [3]		**Retained** [4]		**Differences** [3]-[4]	
	Mean	Median	Mean	Median	t-stat	MW	Mean	Median	Mean	Median	t-stat	MW
t-1	0.09[a]	0.04[a]	0.11[a]	0.05[a]	*-0.85*	*[0.09]*	0.40	0.32	0.58	0.48	*-1.93**	*[0.00]*
t=0	0.13[a]	0.06[a]	0.16[a]	0.08[a]	*-1.26*	*[0.11]*	0.67	0.54	0.64	0.70	*0.29*	*[0.00]*
t+1	0.12[a]	0.06[a]	0.14[a]	0.08[a]	*-0.66*	*[0.39]*	0.69	0.44	0.56	0.59	*1.20*	*[0.00]*
t+2	0.11[a]	0.06[a]	0.15[a]	0.09[a]	*-1.42*	*[0.15]*	0.40	0.33	0.57	0.54	*-2.16***	*[0.00]*
t+3	0.12[a]	0.07[a]	0.15[a]	0.08[a]	*-0.97*	*[0.19]*	0.43	0.36	0.57	0.53	*-1.70**	*[0.00]*

Table 2. Descriptive Statistics

The sample consists of non-backed, PE- and VC-backed IPOs floated on the US stock markets between 1997 and 2010. Table 2 presents pre-IPO accounting characteristics. All accounting items are gathered from the last account report pre-IPO. All continuous variables are winsorized at the 1% and 99% levels. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Non-Backed IPOs [1]		**PE-Backed IPOs** [2]		**VC-Backed IPOs** [3]		**Differences** [1]-[2]		[1]-[3]		[2]-[3]	
	Mean	Median	Mean	Median	Mean	Median	t-stats	[MW]	t-stats	[MW]	t-stats	[MW]
Panel A. Pre-IPO Accounting Characteristics												
IND. ADJ. CASH RATIO	0.29	0.02	-0.01	-0.03	0.36	0.25	*2.33***	*[0.00]*	*-0.67*	*[0.00]*	*-6.92***	*[0.00]*
CASH RATIO	0.41	0.15	0.10	0.05	0.54	0.45	*2.67***	*[0.00]*	*-1.30*	*[0.00]*	*-8.23***	*[0.00]*
SIZE ($ mil)	301.41	52.33	783.86	305.99	69.78	27.12	*-7.32***	*[0.00]*	*6.91***	*[0.00]*	*12.38***	*[0.00]*
LEVERAGE	0.55	0.26	0.71	0.52	0.23	0.10	*-2.06***	*[0.00]*	*6.18***	*[0.00]*	*10.13***	*[0.00]*
CAPEX/TA	0.10	0.05	0.07	0.04	0.08	0.05	*2.77***	*[0.01]*	*1.84**	*[0.05]*	*-2.42***	*[0.00]*
CF/TA	-0.07	0.02	0.09	0.07	-0.29	-0.16	*-4.36***	*[0.00]*	*5.90***	*[0.00]*	*11.77***	*[0.00]*
R&D/TA	0.13	0.00	0.02	0.00	0.29	0.19	*7.03***	*[0.00]*	*-8.06***	*[0.00]*	*-13.27***	*[0.00]*
NWC/TA	0.58	-0.05	0.06	0.02	-0.10	-0.09	*0.85*	*[0.00]*	*1.48*	*[0.00]*	*1.30*	*[0.00]*
FIRM AGE	14.91	8.00	28.58	18.00	6.63	5.00	*-7.20***	*[0.00]*	*8.13***	*[0.00]*	*20.05***	*[0.00]*
UNDERW. REPUT. (%)	6.73		10.76		16.11		*-2.47***	*[0.01]*	*-5.29***	*[0.00]*	*-2.64***	
NASDAQ QUOTED (%)	55.95		50.45		92.32		*1.36*	*[0.17]*	*-16.33***	*[0.00]*	*-19.98***	
HIGH-TECH (%)	44.91		30.07		87.60		*2.17***	*[0.03]*	*-17.16***	*[0.00]*	*-22.37***	
Panel B. Firm and Syndicate Characteristics												
MGT OWN (%)			27.49	13.85	33.68	26.50					*-3.65***	*[0.00]*
IBH OWN (%)			6.86	0.00	4.47	0.00					*2.85***	*[0.00]*
SYNDICATE SIZE			2.32	2.00	3.84	4.00					*-12.83***	*[0.00]*
BANK AFFILIATED FUND (%)			15.88		7.07						*3.85***	
RETENTION DUMMY (%)			75.78		76.89						*-0.45*	
Panel C. Financial Constraints Characteristics												
WW Index			17.18	1.74	18.67	5.98					*-0.40*	*[0.00]*
KZ Index			-0.20	0.69	-3.49	-2.42					*4.46***	*[0.00]*
Dividend Payout Ratio			1.19	0.00	-0.23	0.00					*1.32*	*[0.00]*

Table 3. PE/VC Syndicate Ownership.

The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets. *Panel A* presents PE/VC syndicate ownership pre-IPO and three years post-flotation. "Pre-IPO" and "Post-IPO" represent PE/VC syndicate's ownership of the firm's share capital immediately prior to and after the flotation. Ownership percentages are manually collected from the "Major Shareholders" section of IPO prospectuses. t refers to the IPO year. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. PE/VC Syndicate Ownership (%) Around the IPO Year.

		PE-Backed IPOs [1]		**VC-Backed IPOs** [2]		**Differences** [1]-[2]	
		Mean	Median	Mean	Median	t-stats	[MW]
[A]	PE/VC Syndicate Ownership$_{pre\text{-}IPO}$	69.72	78.40	50.49	51.44	12.52***	[0.00]
[B]	PE/VC Syndicate Ownership$_{post\text{-}IPO}$	47.23	50.20	39.11	40.14	6.71***	[0.00]
	Difference: [B]-[A]	*-13.14****	*[0.00]*	*-10.63****	*[0.00]*		
[C]	PE/VC Syndicate Ownership$_{t+1}$	27.91	25.50	18.70	15.92	7.82***	[0.00]
[D]	PE/VC Syndicate Ownership$_{t+2}$	21.37	14.29	13.57	8.18	7.10***	[0.00]
[E]	PE/VC Syndicate Ownership$_{t+3}$	13.71	0.43	7.75	0.21	6.50***	[0.00]
	Difference: [E]-[C]	*-9.25****	*[0.00]*	*-15.02****	*[0.00]*		

Table 4. The Aftermarket Performance of PE- and VC-Backed IPOs.

The Table reports the summary statistics of underpricing and post-IPO performance. The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets between 1997 and 2010'High cash ratio' includes firms whose cash ratio one year post-IPO is higher than industry-median in a particular year. 'Low Cash Ratio' is defined as those firms whose cash ratio at one year post-IPO is lower than industry-median in a particular year. 'Retained IPOs' are IPOs in which PE/VC syndicates maintained some ownership at first quarter post lockup expiration date, and 'Exited IPOs' are firms in which PE/VC investors sold their entire equity stake at first quarter post lockup expiration date. *Panel A* presents descriptive statistics of PE-Backed IPOs performance measures. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively. Statistical significance of the difference in means and medians between various samples are reported by [a], [b] and [c], to indicate statistical significance at the 1%, 5%, and 10% levels, respectively. In column [1], [a], [b] and [c], refer to the statistical difference between PE high cash ratio retained and exited IPOs ([1]-[2]). In column [3], [a], [b] and [c], refer to the statistical difference between PE low cash retained and exited IPOs ([3]-[4]). *Panel B* presents summary statistics for VC-Backed IPOs. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively. Statistical significance of the difference in means and medians between various samples are reported by [a], [b] and [c], which denote statistical significance at the 1, 5, and 10 percent levels, respectively. In column [5], [a], [b] and [c], refer to the statistical difference between VC high cash ratio retained and exited IPOs ([5]-[6]). In column [7], [a], [b] and [c], refer to the statistical difference between VC low cash retained and exited IPOs ([7]-[8]).

Panel A. Performance of PE-Backed IPOs

	High Cash Ratio		**Low Cash Ratio**		**Differences**	
	Retention	**Exit**	**Retention**	**Exit**	**t-stats**	
	[1]	[2]	[3]	[4]	[1]-[3]	[2]-[4]
Underpricing:						
1st Day	2.66	5.09	1.01[a]	-13.64	*0.33*	*2.09***
Buy-and-hold Returns:						
1 year	6.20[c]	-16.12	-0.96	-0.56	*0.90*	*-1.41*
2 years	-0.91	-22.36	-8.68	-9.55	*0.74*	*-0.69*
3 years	-17.69	-33.91	-23.72[a]	6.25	*0.61*	*-1.44*
Market-Adjusted Buy-and-hold Returns:						
1 year	2.66[c]	-17.45	-3.41	-5.89	*0.81*	*-1.18*
2 years	-6.66	-21.86	-12.57	-20.12	*0.66*	*-0.12*
3 years	-11.83	-23.97	-20.68[c]	1.69	*0.98*	*-1.16*

Panel B. Performance of VC-Backed IPOs

	High Cash Ratio		Low Cash Ratio		Differences	
	Retention	Exit	Retention	Exit	t-stats	
	[5]	[6]	[7]	[8]	[5]-[7]	[6]-[8]
Underpricing:						
1st Day	34.21	28.09	52.03[a]	14.45	*-2.72****	*1.21*
Buy-and-hold Returns:						
1 year	-25.77[a]	-3.78	-42.68[a]	-1.79	*2.58****	*-0.12*
2 years	-51.57[a]	29.33	-69.75[a]	-5.32	*2.17***	*1.16*
3 years	-57.55[a]	-9.26	-76.44[a]	27.83	*2.08***	*-0.80*
Market-Adjusted Buy-and-hold Returns:						
1 year	-25.41[c]	-10.78	-43.24[a]	-8.59	*2.90****	*-0.14*
2 years	-40.22[a]	-0.76	-55.24[a]	-19.75	*2.32***	*0.80*
3 years	-41.43	-33.09	-56.34[a]	14.51	*2.09***	*-1.25*

Table 5. Multivariate Analysis of Backed IPOs' Cash Ratio.

Table 5 presents results of multivariate analysis of backed IPOs' cash ratio. The sample consists of 3600 firm year observations for 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable is the natural logarithm of cash ratio (cash over total assets) one, two and three years post-flotation. In *Panel A*, individual effects of PE/VC ownership retention, fund characteristics and financial constraint are examined. In *Panel B*, the interaction effects on cash holdings of PE- and VC-backed IPOs are analyzed. *Panel C (D)* reports the analysis of cash holdings of financial constrained and unconstrained PE (VC)-backed IPOs. In *Panel D*, PE and VC firms are classified into '*Unconstrained*' and '*Constrained*' firms every year. Following Lamont *et al* (2001), I rank all firms based on KZ index each year, and assign the top 33% of firms as 'constrained', and the bottom 33% as 'unconstrained.' I use the same procedure for the WW index. The ranking of PE and VC firms based on the two indices are done *separately* each year. Based on the dividend payout ratio, firms are classified each year as 'unconstrained' if a firm pays dividends, and 'constrained' in the case a firm does not pay dividends. All USD Dollars values are deflated to 2005 dollars. All continuous variables are winsorized at the 1% and 99% levels. t-statistics are reported in brackets. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Individual Effects	**All Backed IPOs**		**PE-backed IPOs**		**VC-backed IPOs**	
	[1]	[2]	[3]	[4]	[5]	[6]
INTERCEPT	0.12	-0.05	-0.84***	-0.73***	0.18	0.36*
	[0.89]	[-0.36]	[-3.45]	[-2.53]	[1.16]	[1.80]
PE DUMMY	-0.42***	-0.39***				
	[-13.95]	[-10.85]				
RETENTION DUMMY	0.09***		-0.04		0.18***	
	[3.56]		[-0.68]		[6.65]	
VOLANTARY OWN		-0.11*		-0.33***		0.15*
		[-1.76]		[-3.42]		[1.91]
BANK AFFILIATED DUMMY	-0.10***	-0.06	-0.28***	-0.29***	-0.03	-0.01
	[-2.56]	[-1.32]	[-3.41]	[-3.08]	[-0.72]	[-0.11]
LARGE SYND. DUMMY	0.11***	0.13***	0.09**	0.15***	0.09***	0.11***
	[5.11]	[5.52]	[2.06]	[3.01]	[4.53]	[4.42]
FIN. CONSTRAINT INDEX (WW)	0.00	0.00	0.00	0.00	0.00	0.00
	[-0.41]	[-0.29]	[0.97]	[0.66]	[-0.88]	[-0.57]
SIZE	-0.12***	-0.11***	-0.11***	-0.08***	-0.10***	-0.09***
	[-11.68]	[-8.68]	[-5.67]	[-3.46]	[-9.07]	[-6.74]
M/B	0.00	0.00	0.00	0.00	0.01***	0.01***
	[-0.84]	[-0.95]	[-1.25]	[-1.04]	[3.97]	[2.56]
CF	0.17***	0.15***	1.12***	1.16***	0.09**	0.09*
	[3.51]	[2.67]	[4.71]	[4.29]	[2.17]	[1.82]
NWC	-0.05***	-0.07**	-0.67***	-0.62***	-0.03***	-0.02
	[-3.15]	[-2.08]	[-6.11]	[-4.86]	[-2.85]	[-0.52]
R&D	0.26***	0.31***	2.13***	3.12***	0.20***	0.24***
	[3.50]	[3.72]	[3.44]	[4.33]	[3.30]	[3.35]
CAPEX	-0.33**	-0.25	-0.63**	-0.63*	-0.20	0.00
	[-2.14]	[-1.34]	[-2.13]	[-1.87]	[-1.18]	[-0.02]
ACQ	-0.16***	-0.12***	-0.81***	-0.73***	-0.12***	-0.12***
	[-3.94]	[-2.81]	[-3.86]	[-2.94]	[-3.49]	[-3.03]
DIV DUMMY	0.13***	0.16***	0.14***	0.17***	0.03	0.02
	[3.58]	[3.53]	[2.64]	[2.58]	[0.48]	[0.23]
LEV	0.04*	0.04*	0.02	0.01	0.01	0.02
	[1.66]	[1.77]	[0.47]	[0.27]	[0.39]	[0.54]
SALES G	-0.03***	-0.04***	-0.09	-0.20***	-0.03***	-0.04***
	[-2.42]	[-2.79]	[-1.34]	[-2.69]	[-2.62]	[-2.76]
FIRM AGE	-0.07***	-0.08***	-0.08***	-0.10***	-0.07***	-0.07***
	[-4.98]	[-4.20]	[-3.72]	[-3.73]	[-3.58]	[-2.74]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
No of Obs.	2374	1744	854	627	1520	1117
Adjusted R^2	50.25%	49.29%	29.86%	32.43%	33.16%	31.32%

Panel B. Interaction Effects	**All Backed IPOs**		**PE-backed IPOs**		**VC-backed IPOs**	
	[1]	[2]	[3]	[4]	[5]	[6]
INTERCEPT	0.14	-0.05	-0.63***	-0.73***	0.22	0.36*
	[1.06]	[-0.36]	[-2.60]	[-2.53]	[1.37]	[1.83]
PE DUMMY	-0.43***	-0.39***				
	[-14.01]	[-10.84]				
RETENTION DUMMY	0.08***		-0.03		0.15***	
	[2.79]		[-0.54]		[5.34]	
PE/VC VOL OWN		-0.11*		-0.34***		0.20***
		[-1.75]		[-3.37]		[2.38]
FIN. CONSTRAINT INDEX (WW)	-0.01***	0.00	0.00	0.00	-0.01***	0.00
	[-2.57]	[-0.35]	[0.39]	[0.10]	[-3.64]	[0.37]
FIN. CONSTRAINT INDEX (WW)*RETENTION	0.01***		0.00		0.01***	
	[2.54]		[-0.11]		[3.57]	
FIN. CONSTRAINT INDEX (WW)*VOLUNTARY OWN		0.00		0.00		0.00
		[0.19]		[0.18]		[-1.52]
BANK AFFILIATED DUMMY	-0.09***	-0.06	-0.28***	-0.28***	-0.02	0.00
	[-2.38]	[-1.34]	[-3.41]	[-3.06]	[-0.52]	[-0.02]
LARGE SYND. DUMMY	0.11***	0.13***	0.09**	0.14***	0.09***	0.11***
	[5.10]	[5.52]	[2.01]	[3.00]	[4.56]	[4.44]
SIZE	-0.12***	-0.11***	-0.12***	-0.08***	-0.10***	-0.09***
	[-11.73]	[-8.67]	[-5.71]	[-3.44]	[-9.24]	[-6.83]
M/B	0.00	0.00	0.00	0.00	0.01***	0.01***
	[-0.83]	[-0.94]	[-1.25]	[-1.04]	[4.08]	[2.56]
CF	0.17***	0.15***	1.12***	1.17***	0.09**	0.10*
	[3.49]	[2.66]	[4.72]	[4.28]	[2.18]	[1.89]
NWC	-0.05***	-0.07**	-0.67***	-0.62***	-0.03***	-0.02
	[-3.14]	[-2.08]	[-6.09]	[-4.84]	[-2.88]	[-0.54]
R&D	0.25***	0.31***	2.15***	3.13***	0.20***	0.25***
	[3.46]	[3.71]	[3.48]	[4.33]	[3.17]	[3.42]
CAPEX	-0.33**	-0.25	-0.62**	-0.63*	-0.22	-0.01
	[-2.13]	[-1.34]	[-2.09]	[-1.87]	[-1.29]	[-0.04]
ACQ	-0.16***	-0.12***	-0.83***	-0.73***	-0.13***	-0.11***
	[-4.03]	[-2.81]	[-4.00]	[-2.93]	[-3.58]	[-3.01]
DIV DUMMY	0.13***	0.16***	0.15***	0.17***	0.02	0.02
	[3.55]	[3.53]	[2.70]	[2.58]	[0.27]	[0.26]

LEV	0.04*	0.04*	0.01	0.01	0.02	0.02
	[1.68]	[1.78]	[0.42]	[0.28]	[0.54]	[0.52]
SALES G	-0.04***	-0.04***	-0.09	-0.20***	-0.03***	-0.04***
	[-2.50]	[-2.79]	[-1.37]	[-2.69]	[-2.72]	[-2.76]
FIRM AGE	-0.07***	-0.08***	-0.08***	-0.10***	-0.07***	-0.07***
	[-5.09]	[-4.20]	[-3.70]	[-3.73]	[-3.65]	[-2.69]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
No of Obs.	2383	1744	860	627	1523	1117
Adjusted R^2	50.50%	49.26%	29.85%	32.32%	33.61%	31.41%

Panel C.	**Cash Ratio of PE-Backed IPOs**											
	WW Index				KZ Index				Dividend Payout Ratio			
	Unconstrained		*Constrained*		*Unconstrained*		*Constrained*		*Unconstrained*		*Constrained*	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
INTERCEPT	-1.12***	-1.38***	-0.39	-0.15	-1.08***	-0.98*	-0.35	-0.27	-1.22***	-1.44***	-0.87***	-1.02***
	[-4.05]	[-3.90]	[-0.51]	[-0.24]	[-2.58]	[-1.69]	[-0.52]	[-0.40]	[-3.33]	[-2.37]	[-2.85]	[-2.91]
RETENTION DUMMY	-0.01		-0.04		0.06		-0.17		-0.02		-0.08	
	[-0.20]		[-0.36]		[0.94]		[-1.04]		[-0.25]		[-1.21]	
VOLUNTARY OWN		-0.39***		-0.16		-0.04		-0.15		-0.29		-0.30***
		[-3.42]		[-0.82]		[-0.30]		[-0.61]		[-1.30]		[-2.66]
BANK AFFILIATED DUMMY	-0.27***	-0.20*	-0.43***	-0.59***	-0.11	-0.12	0.31*	0.58***	-0.29**	-0.33*	-0.24***	-0.29***
	[-2.90]	[-1.95]	[-2.36]	[-2.88]	[-1.00]	[-0.90]	[1.67]	[2.70]	[-2.25]	[-1.85]	[-2.54]	[-2.78]
LARGE SYND. DUMMY	0.10*	0.16***	0.15*	0.21**	0.04	0.09	-0.14	-0.23*	0.27***	0.33***	0.09*	0.12**
	[1.85]	[2.77]	[1.78]	[2.22]	[0.74]	[1.23]	[-1.11]	[-1.75]	[3.72]	[3.04]	[1.71]	[2.21]
SIZE	-0.08***	-0.05	-0.16***	-0.16***	-0.07***	-0.05	-0.06	-0.13*	-0.16***	-0.17***	-0.09***	-0.06**
	[-3.38]	[-1.60]	[-4.34]	[-3.41]	[-2.62]	[-1.38]	[-0.99]	[-1.96]	[-5.33]	[-3.26]	[-3.46]	[-2.12]
M/B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	[-0.77]	[-0.47]	[-1.32]	[-1.29]	[0.19]	[0.01]	[-0.91]	[-1.22]	[1.52]	[0.89]	[-1.12]	[-0.91]
CF	1.25***	1.14***	1.13***	1.39***	1.05***	1.43***	0.06	0.26	1.22***	1.14*	1.02***	1.19***
	[4.11]	[3.33]	[2.72]	[2.87]	[3.15]	[3.49]	[0.07]	[0.27]	[3.08]	[1.92]	[3.59]	[3.84]
NWC	-0.84***	-0.79***	0.11	0.30	-0.63***	-0.46**	-1.04***	-1.01***	-0.50***	-0.23	-0.68***	-0.69***
	[-6.74]	[-5.53]	[0.41]	[0.91]	[-3.23]	[-2.09]	[-5.38]	[-5.22]	[-2.83]	[-0.54]	[-4.89]	[-4.88]
R&D	1.95***	3.03***	2.61***	3.75***	2.15***	2.80***	3.88	3.05	-0.49	1.07	2.57***	3.36***
	[2.34]	[3.03]	[2.62]	[3.29]	[2.48]	[2.79]	[1.20]	[0.82]	[-0.30]	[0.47]	[3.73]	[4.29]
CAPEX	-0.46	-0.31	-1.12**	-1.37***	0.71*	0.60	-0.50	-0.16	0.30	1.19**	-1.13***	-1.28***
	[-1.19]	[-0.71]	[-2.25]	[-2.38]	[1.65]	[1.18]	[-0.48]	[-0.14]	[0.79]	[2.06]	[-3.07]	[-3.08]
ACQ	-0.65***	-0.45	-1.20***	-1.42***	-1.57***	-1.68***	-0.96	-0.91	-0.99***	-0.98***	-0.91***	-0.82***
	[-2.63]	[-1.48]	[-2.97]	[-3.01]	[-3.31]	[-3.29]	[-1.64]	[-1.42]	[-3.63]	[-2.41]	[-3.26]	[-2.76]

DIV DUMMY	0.07	0.07	0.36***	0.41***	-0.11	-0.12	0.45***	0.46***				
	[1.14]	[0.95]	[3.41]	[3.28]	[-1.56]	[-1.37]	[2.39]	[2.32]				
LEV	0.03	0.03	-0.03	-0.09	0.06	0.07	-0.48*	-0.42	-0.12*	-0.06	0.02	0.02
	[0.74]	[0.79]	[-0.46]	[-0.95]	[1.26]	[1.37]	[-1.72]	[-1.46]	[-1.82]	[-0.60]	[0.55]	[0.53]
SALES G	-0.04	-0.14	-0.13	-0.05	-0.06	-0.17	-0.04	-0.03	0.04	-0.09	-0.18**	-0.22***
	[-0.50]	[-1.63]	[-0.87]	[-0.30]	[-0.68]	[-1.57]	[-0.34]	[-0.19]	[0.47]	[-0.70]	[-2.06]	[-2.43]
FIRM AGE	-0.07***	-0.08***	-0.14***	-0.17***	-0.11***	-0.13***	-0.06	-0.08	-0.04	-0.03	-0.10***	-0.10***
	[-2.70]	[-2.53]	[-3.42]	[-3.52]	[-3.70]	[-3.19]	[-1.17]	[-1.39]	[-1.27]	[-0.56]	[-3.66]	[-3.15]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
No of Obs.	591	425	269	202	259	192	119	100	263	143	631	497
Adjusted R^2	28.53%	31.39%	35.13%	38.29%	36.85%	38.01%	35.94%	41.31%	38.29%	40.71%	31.26%	33.13%

Panel D.	**Cash Ratio of VC-Backed IPOs**											
	WW Index				KZ Index				Dividend Payout Ratio			
	Unconstrained		*Constrained*		*Unconstrained*		*Constrained*		*Unconstrained*		*Constrained*	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
INTERCEPT	0.30	0.53*	0.00	-0.14	-0.02	0.24	-0.69	-0.53	0.69	-1.43	0.22	0.36
	[1.42]	[1.88]	[0.02]	[-0.66]	[-0.11]	[1.08]	[-1.58]	[-1.11]	[1.54]	[-1.61]	[1.48]	[1.15]
RETENTION DUMMY	0.21***		0.10***		0.08**		0.13		0.02		0.18***	
	[5.93]		[2.66]		[2.03]		[1.60]		[0.39]		[6.41]	
VOLUNTARY OWN		0.20*		0.12		-0.02		0.28		-0.35		0.10
		[1.82]		[1.20]		[-0.20]		[1.57]		[-0.82]		[1.28]
BANK AFFILIATED DUMMY	-0.05	-0.05	0.08	0.11*	0.05	0.03	-0.31***	-0.26**	0.08	-0.22	-0.02	0.01
	[-0.97]	[-0.77]	[1.47]	[1.72]	[0.91]	[0.45]	[-2.65]	[-2.05]	[1.01]	[-1.22]	[-0.47]	[0.25]
LARGE SYND. DUMMY	0.10***	0.12***	0.09***	0.11***	0.07***	0.09***	0.09	0.14**	0.06	-0.09	0.09***	0.12***
	[3.59]	[3.52]	[3.11]	[3.19]	[2.41]	[2.78]	[1.60]	[2.11]	[1.16]	[-0.73]	[4.46]	[4.93]
SIZE	-0.13***	-0.14***	-0.04**	-0.01	-0.07***	-0.09***	-0.10***	-0.10***	-0.09***	-0.05	-0.10***	-0.10***
	[-8.67]	[-7.24]	[-2.29]	[-0.74]	[-4.58]	[-4.42]	[-3.12]	[-2.75]	[-3.07]	[-0.94]	[-9.06]	[-7.14]
M/B	0.01***	0.01***	0.00	0.00	0.01*	0.00	0.00	0.00	0.01***	0.00	0.01***	0.01***
	[4.09]	[2.83]	[0.41]	[-0.10]	[1.92]	[1.42]	[1.15]	[1.24]	[4.65]	[-0.36]	[3.26]	[2.86]
CF	0.11*	0.11	0.01	-0.02	0.10	0.11	0.01	-0.10	0.05	-0.10	0.18***	0.19***
	[1.75]	[1.45]	[0.20]	[-0.31]	[1.35]	[1.22]	[0.06]	[-0.59]	[0.58]	[-0.69]	[4.45]	[3.76]
NWC	0.00	-0.02	-0.13***	-0.48***	-0.02***	0.12*	-0.46***	-0.45***	-0.33***	-0.11	-0.03***	-0.03
	[-0.12]	[-0.45]	[-7.49]	[-4.59]	[-2.54]	[1.85]	[-5.35]	[-4.69]	[-2.82]	[-0.53]	[-3.01]	[-0.94]
R&D	0.32***	0.32***	-0.02	-0.11	-0.11	-0.07	0.06	-0.09	-0.15	-0.15	0.38***	0.43***
	[3.46]	[2.95]	[-0.30]	[-1.15]	[-1.47]	[-0.69]	[0.27]	[-0.36]	[-1.54]	[-0.99]	[5.82]	[5.62]
CAPEX	-0.20	-0.05	-0.21	-0.05	-0.44	-0.62*	0.95**	1.05**	-0.57*	0.75	-0.35**	-0.21
	[-0.96]	[-0.19]	[-0.72]	[-0.14]	[-1.61]	[-1.89]	[2.05]	[2.09]	[-1.68]	[0.73]	[-1.97]	[-0.99]
ACQ	-0.11***	-0.10***	-0.52**	-0.12	-0.96***	-0.89***	-0.52***	-0.47***	-0.46	1.45***	-0.11***	-0.09***
	[-2.81]	[-2.34]	[-2.20]	[-0.41]	[-3.80]	[-3.03]	[-4.36]	[-3.70]	[-1.44]	[2.75]	[-3.15]	[-2.44]

DIV DUMMY	0.08	0.10	-0.05	-0.09	0.00	0.05	-0.44	-0.45				
	[1.23]	[1.06]	[-0.55]	[-0.76]	[-0.09]	[0.68]	[-1.30]	[-1.23]				
LEV	0.02	0.03	-0.52***	-0.54***	0.34***	0.08	-0.15	-0.23	-0.95***	-0.65***	0.01	0.01
	[0.60]	[0.76]	[-5.22]	[-4.90]	[8.42]	[0.74]	[-0.90]	[-1.21]	[-6.24]	[-2.59]	[0.31]	[0.33]
SALES G	-0.05***	-0.05***	0.04	0.10***	-0.14***	-0.11**	0.02	0.02	-0.27***	-0.37**	-0.03***	-0.03***
	[-3.52]	[-3.19]	[1.45]	[2.70]	[-3.03]	[-1.98]	[1.25]	[1.12]	[-3.63]	[-2.21]	[-2.29]	[-2.43]
FIRM AGE	-0.10***	-0.11***	-0.03	-0.01	-0.02	-0.04	0.07	0.06	-0.12***	-0.34***	-0.08***	-0.06**
	[-3.89]	[-3.19]	[-0.94]	[-0.29]	[-0.81]	[-1.04]	[1.19]	[0.76]	[-3.33]	[-3.27]	[-3.62]	[-2.14]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
No of Obs.	1004	717	519	400	316	237	149	128	234	64	1416	1092
Adjusted R^2	35.46%	35.03%	35.92%	34.97%	44.34%	35.74%	70.71%	68.83%	51.31%	68.79%	35.58%	33.08%

Table 6. Backed IPOs' Mean Financial Constraints.

Table 6 presents mean financial constraints by PE and VC ownership for the two samples of IPOs pre-flotation, 1, 2, and 3 years post-flotation (*Panel A*). Ownership terciles for PE and VC samples are redefined every year. It also presents t-statistics for differences-in-means between top and bottom ownership terciles for PE and VC samples. *Panel B* presents t-statistics for differences-in-means between current time period and last time period. *Panel C* reports the summary statistics for backed IPOs financial constraints around the year of PE/VC syndicates' full exit post-IPO. 'Pre-event' ('post-event') refers to one year before (after) the financial sponsors' full exit post-flotation. Also, t-statistics for differences-in-means between financial constraints post- and pre- PE/VC syndicate full exit are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Mean Financial Constraint by PE and VC Ownership.

	Ownership Terciles	PE-Backed IPOs			VC-Backed IPOs		
		KZ Index	WW Index	Div. Payout (Constrained)	KZ Index	WW Index	Div. Payout (Constrained)
[1]	Top Tercile: PE/VC Ownership$_{pre\text{-}IPO}$		8.12	56.00%		13.90	61.00%
[2]	Bottom Tercile: PE/VC Ownership$_{pre\text{-}IPO}$		25.65	52.94%		-1.52	70.00%
	Difference [1]-[2]		*-1.89**	*0.43*		*1.30*	*-1.87**
[3]	Top Tercile: PE/VC Ownership$_{t+1}$	1.21	16.27	79.82%	-0.27	23.07	95.31%
[4]	Bottom Tercile: PE/VC Ownership$_{t+1}$	0.66	10.24	75.93%	-0.54	14.40	91.94%
	Difference [3]-[4]	*1.78**	*0.89*	*0.69*	*0.94*	*1.65**	*1.35*
[5]	Top Tercile: PE/VC Ownership$_{t+2}$	1.36	4.94	83.18%	-0.50	34.04	93.06%
[6]	Bottom Tercile: PE/VC Ownership$_{t+2}$	0.67	9.05	69.05%	-0.44	14.07	93.13%
	Difference [5]-[6]	*1.33*	*-1.04*	*2.32****	*-0.12*	*3.77****	*-0.02*
[7]	Top Tercile: PE/VC Ownership$_{t+3}$	1.47	4.03	81.48%	-0.76	53.88	94.67%
[8]	Bottom Tercile: PE/VC Ownership$_{t+3}$	0.45	18.40	65.08%	-0.61	37.88	91.67%
	Difference [7]-[8]	*2.20***	*-2.60**	*2.43****	*-0.39*	*1.92**	*0.92*

Panel B. Differences-in-means (t-stat) between current time period and last period.

	PE-Backed IPOs			VC-Backed IPOs		
	KZ Index	WW Index	Div. Payout (Constrained)	KZ Index	WW Index	Div. Payout (Constrained)
Top Tercile						
Difference [3]-[1]		1.06	3.81***		1.52	8.95***
Difference [5]-[3]	0.41	-1.79*	0.63	-0.55	1.74*	-0.92
Difference [7]-[5]	0.35	-0.47	-0.32	-0.56	2.52***	0.62
Bottom Tercile						
Difference [4]-[2]		-1.88*	3.57***		1.56	5.61***
Difference [6]-[4]	0.02	-0.92	-1.06	0.22	-0.09	0.39
Difference [8]-[6]	-0.29	1.05	-0.50	-0.74	2.88***	-0.40

Panel C.

Timing	No of IPOs		KZ Index [1]	WW Index [2]	Div. Payout (Constrained) [3]
PE/VC Syndicate full exit 1 year post-IPO	322	Pre-event Financial Constraint	-1.67	12.39	56.28%
		Post-event Financial Constraint	0.02	13.34	85.06%
		Difference [post-pre]	*2.13***	*0.24*	*6.07****
PE/VC Syndicate full exit 2 years post-IPO	145	Pre-event Financial Constraint	-0.16	17.72	86.00%
		Post-event Financial Constraint	-1.04	16.94	75.76%
		Difference [post-pre]	*-0.73*	*-0.07*	*-1.18*
PE/VC Syndicate full exit 3 years post-IPO	256	Pre-event Financial Constraint		19.72	84.85%
		Post-event Financial Constraint		27.86	88.46%
		Difference [post-pre]		*0.94*	*0.61*

Table 7. OLS Analysis of the Aftermarket Performance

Table 7 presents results of OLS regression of the aftermarket performance of PE-backed (*Panel A*) and VC-backed IPOs (*Panel B*). The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable is three years market-adjusted BHARs. t is the IPO year. t-statistics are reported in brackets. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

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	Three year market-adjusted BHARs											
	Panel A. PE-Backed IPOs						Panel B. VC-Backed IPOs					
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
	[1]		[2]		[3]		[4]		[5]		[6]	
INTERCEPT	-1.18***	[-2.61]	-1.15***	[-2.54]	-1.17***	[-2.59]	-1.99***	[-6.65]	-2.03***	[-6.88]	-1.96***	[-6.28]
PE/VC RETENTION DUMMY	-0.05	[-0.50]			-0.08	[-0.86]	-0.04	[-0.79]			-0.01	[-0.09]
IND. ADJ. CASH RATIO$_{IPO\ YEAR+1}$			-0.08	[-0.29]	-1.19**	[-2.23]			0.10	[1.44]	0.22	[1.57]
IND.ADJ.CASH RATIO$_{IPO\ YEAR+1}$ * PE/VC RETENTION DUMMY					1.40**	[2.29]					-0.16	[-1.00]
FDR	-0.08	[-0.79]	-0.08	[-0.81]	-0.02	[-0.23]	-0.02	[-0.79]	-0.02	[-0.91]	-0.02	[-0.86]
SIZE$_{IPO\ YEAR+1}$	0.40***	[5.20]	0.40***	[5.20]	0.38***	[5.00]	0.16***	[5.99]	0.16***	[6.18]	0.16***	[5.84]
M/B$_{IPO\ YEAR+1}$	-0.01	[-1.42]	-0.01	[-1.42]	-0.01	[-1.43]	-0.01	[-0.08]	-0.01	[-0.11]	-0.01	[-0.12]
LEV$_{IPO\ YEAR+1}$	-0.06	[-0.86]	-0.06	[-0.88]	-0.04	[-0.60]	-0.08	[-1.20]	-0.03	[-0.25]	-0.01	[-0.09]
PE VC LOCKUP DUR.	-0.01	[-1.05]	-0.01	[-1.04]	-0.01	[-1.18]	0.01	[1.09]	0.01	[1.03]	0.01	[0.68]
UNDERW. REPUTATION	-0.08*	[-1.87]	-0.08**	[-2.02]	-0.07*	[-1.82]	0.01	[0.69]	0.01	[0.61]	0.01	[0.54]
MGT OWN$_{IPO\ YEAR+1}$	0.16	[0.56]	0.16	[0.53]	0.23	[0.79]	-0.14	[-1.10]	-0.11	[-0.92]	-0.13	[-1.04]
IBH OWN$_{IPO\ YEAR+1}$	0.27	[0.61]	0.29	[0.65]	0.35	[0.79]	-0.09	[-0.29]	-0.06	[-0.21]	-0.02	[-0.07]
FIRM AGE	0.01	[0.06]	0.01	[0.08]	0.01	[0.22]	0.06**	[2.30]	0.07***	[2.46]	0.06**	[2.29]
INDUSTRY DUMMIES	YES		YES		YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES		YES		YES	
No of Obs.	244		244		244		428		428		428	
R^2	0.2461		0.2455		0.2594		0.2695		0.2700		0.2731	

Table 8. Analysis of the Industry-Adjusted Annual Excess Stock Returns

Panel A provides descriptive statistics of post-IPO accounting characteristics. The sample consists of 3600 firm year observations for 446 PE- and 900 VC-backed IPOs floated on the US stock markets. Δ signifies the change at time t which is calculated as the difference between t and t-1. Financial variables except for leverage are scaled by lagged market capitalization. $r_{i,t}$-$R_{i,t}$ is the industry-adjusted annual excess stock returns. Industry-adjusted annual buy-and-hold abnormal returns are calculated by computing IPO company's annual fiscal year buy-and-hold returns and subtracting corresponding Fama-French industry value-weighted returns. $Cash_t$ is cash and short-term investments at time period t. Δ$Earnings_t$ is the change in earnings scaled by lagged market capitalization. Δ$Net\ Assets_t$ is the change in net assets scaled by lagged market capitalization. Δ$R\&D_t$ is the change in Research and Development expense scaled by lagged market capitalization. Δ$Interest_t$ is the change in interest scaled by lagged market capitalization. Δ$Dividends_t$ is the change in common dividends scaled by lagged market capitalization. $Leverage_t$ is calculated as all debt (long-term and current liabilities) divided by market value of total assets. $Net\ Financing_t$ is calculated as new net equity issues plus net new debt issues. *Panel B* presents results of OLS regressions. The dependent variable is the industry-adjusted annual excess stock returns. The sample consists of 3600 firm year observations for 446 PE- and 900 VC-backed IPOs floated on the US stock markets. "Retained IPOs" are those IPOs in which PE/VC syndicates have maintained some ownership at first quarter post lockup expiration date, and "Exited IPOs" are those firms in which PE/VC investors have sold all their equity stake at first quarter post lockup expiration date. All USD Dollars values are deflated to 2005 dollars. All continuous variables are winsorized at the 1% and 99% levels. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Post-IPO Accounting Characteristics					
	PE-Backed IPOs [1]		**VC-Backed IPOs** [2]		**Differences** [1]-[2]	
	Mean	Median	Mean	Median	t-stats	[MW]
$r_{i,t}$-$R_{i,t}$	-0.115	-0.189	-0.277	-0.524	4.37***	[0.00]
Δ$Cash_t$	0.086	0.000	0.041	-0.018	0.39	[0.00]
$Cash_{t-1}$	0.259	0.111	0.544	0.264	-6.59***	[0.00]
Δ$Earnings_t$	0.128	0.004	0.124	0.001	0.03	[0.15]
Δ$Net\ Assets_t$	-0.366	0.000	-0.010	0.000	-0.88	[0.00]
Δ$R\&D_t$	-0.023	0.000	-0.039	0.000	1.76*	[0.00]
Δ$Interest_t$	-0.006	0.000	0.000	0.000	-0.92	[0.67]
Δ$Dividends_t$	-0.005	0.000	0.000	0.000	-1.27	[0.08]
$Leverage_t$	0.439	0.265	0.126	0.020	17.26***	[0.00]
$Net\ Financing_t$	47.225	1.539	36.451	6.565	2.92***	[0.00]

Panel B.

	PE-Backed IPOs				VC-Backed IPOs			
	Exited		**Retained**		**Exited**		**Retained**	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
	[1]		[2]		[3]		[4]	
Intercept	0.19	[0.85]	-0.28	[-1.35]	0.28	[0.77]	-0.25	[-1.62]
$\Delta Cash_t$	0.72	[0.38]	1.70**	[1.99]	0.48	[0.80]	0.09	[0.56]
$Cash_{t-1}*\Delta Cash_t$	1.34	[1.51]	-0.32**	[-2.18]	-0.25	[-1.05]	-0.06***	[-3.31]
$Leverage_t*\Delta Cash_t$	0.28	[0.32]	-0.30**	[-2.25]	-0.68	[-0.86]	-0.37*	[-1.76]
HP $Index_t$ Dummy$*\Delta Cash_t$	0.26	[1.03]	0.15	[1.27]	-0.02	[-0.20]	-0.02	[-0.79]
$Cash_{t-1}$	-0.61***	[-3.58]	-0.44***	[-4.24]	-0.11	[-1.49]	-0.13***	[-4.79]
$Leverage_t$	0.00	[-0.03]	-0.09***	[-2.46]	0.23***	[4.53]	-0.24***	[-3.44]
HP $Index_t$ Dummy	-0.54*	[-1.90]	-0.20	[-0.79]	-0.27***	[-2.87]	-0.19***	[-4.71]
$\Delta Earnings_t$	0.15	[0.67]	0.06	[1.01]	0.04	[0.40]	0.01	[0.98]
ΔNet $Assets_t$	25.42	[0.25]	10.16	[1.10]	-0.48	[-0.83]	-2.78	[-1.20]
$\Delta R\&D_t$	-5.10	[-0.70]	1.72	[1.33]	0.85**	[2.06]	0.14	[0.96]
$\Delta Interest_t$	-31.22	[-0.68]	11.45	[1.22]	-7.11	[-0.74]	-6.51	[-0.91]
$\Delta Dividends_t$	0.51	[0.45]	0.10	[0.25]	-6.94	[-1.14]	0.89	[0.39]
Net $Financing_t$	0.10	[0.93]	-0.04	[-1.49]	-0.06*	[-1.69]	0.01	[0.25]
INDUSTRY DUMMIES	YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES	
No of Obs.	180		671		310		1123	
R^2	0.2801		0.1673		0.2459		0.1921	

Table 9. Endogeneity Tests

Table 9 reports the results of endogeneity tests. I use instrumental variables approach. The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable is equal to PE/VC ownership retention in Model [1] and [3], whereas the dependent variable is equal to the natural logarithm of cash ratio (cash and short-term investments over total assets) one, two and three years post-flotation in Models [2] and [4]. In Model [2], the equation is estimated with PE house age as an instrument for PE syndicate ownership retention. PE house age is calculated as the difference between time t (IPO year) and lead PE house founding year. In Model [4], the equation is estimated with underpricing as an instrument for VC syndicate ownership retention. Underpricing is calculated as the ratio of the difference between closing price at the first day of trading and offer price, divided by the offer price. t-statistics are reported in brackets. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Interaction Effects					
PE-Backed IPOs			**VC-Backed IPOs**		
	First Stage [1]	2SLS [2]		First Stage [3]	2SLS [4]
INTERCEPT	0.92***	-5.99	INTERCEPT	0.45***	-0.43*
	[8.15]	[-1.85]		[2.53]	[-1.72]
RETENTION IV: PE HOUSE AGE	0.01**	6.33*	RETENTION IV: UNDERPRICING	0.07***	0.57
	[2.08]	[1.78]		[2.44]	[1.36]
FIN. CONSTRAINT INDEX (KZ)	-1.34***	7.70	FIN. CONSTRAINT INDEX (KZ)	0.04***	-0.06***
	[-11.69]	[1.59]		[3.38]	[-2.58]
FIN. CONSTRAINT INDEX (KZ)*RETENTION	1.34***	-7.77	FIN. CONSTRAINT INDEX (KZ)*RETENTION	-0.06***	0.05*
	[11.69]	[-1.61]		[-4.43]	[1.90]
BANK AFFILIATED DUMMY	0.01	-0.12	BANK AFFILIATED DUMMY	0.01	-0.16***
	[0.63]	[-0.70]		[0.09]	[-2.49]
LARGE SYND. DUMMY	-0.02	0.10	LARGE SYND. DUMMY	0.13***	0.05
	[-1.49]	[0.69]		[4.12]	[0.81]
SIZE	0.00	-0.17**	SIZE	0.02	-0.12***
	[0.35]	[-2.26]		[0.89]	[-5.31]
M/B	0.01	-0.01	M/B	0.01**	0.00
	[0.46]	[-1.60]		[2.31]	[0.14]

CF	0.05	0.20	CF	0.08	-0.02
	[0.51]	[0.27]		[1.04]	[-0.27]
NWC	-0.01	-0.62***	NWC	0.00	-0.02*
	[-0.30]	[-2.71]		[-0.11]	[-1.93]
R&D	-0.08	4.05*	R&D	0.20**	-0.11
	[-0.30]	[1.91]		[2.09]	[-0.78]
CAPEX	0.06	-0.95	CAPEX	0.13	-0.12
	[0.45]	[-0.95]		[0.44]	[-0.39]
ACQ	-0.02	-0.42	ACQ	0.03	-0.50***
	[-0.15]	[-0.46]		[0.26]	[-4.61]
DIV DUMMY	0.01	-0.21	DIV DUMMY	-0.30***	0.11
	[0.48]	[-1.18]		[-3.47]	[0.72]
LEV	0.01	-0.18*	LEV	-0.11**	0.18***
	[1.09]	[-1.72]		[-2.02]	[2.52]
SALES G	0.00	-0.14	SALES G	0.01	-0.04***
	[-0.09]	[-0.94]		[0.15]	[-3.67]
FIRM AGE	0.01	-0.18*	FIRM AGE	0.10***	-0.04
	[0.57]	[-1.93]		[3.06]	[-0.72]
INDUSTRY DUMMIES	YES	YES	INDUSTRY DUMMIES	YES	YES
YEAR DUMMIES	YES	YES	YEAR DUMMIES	YES	YES
No of Obs.	196	196	No of Obs.	465	465
Adjusted R^2	42.58%	15.45%	Adjusted R^2	22.72%	40.61%

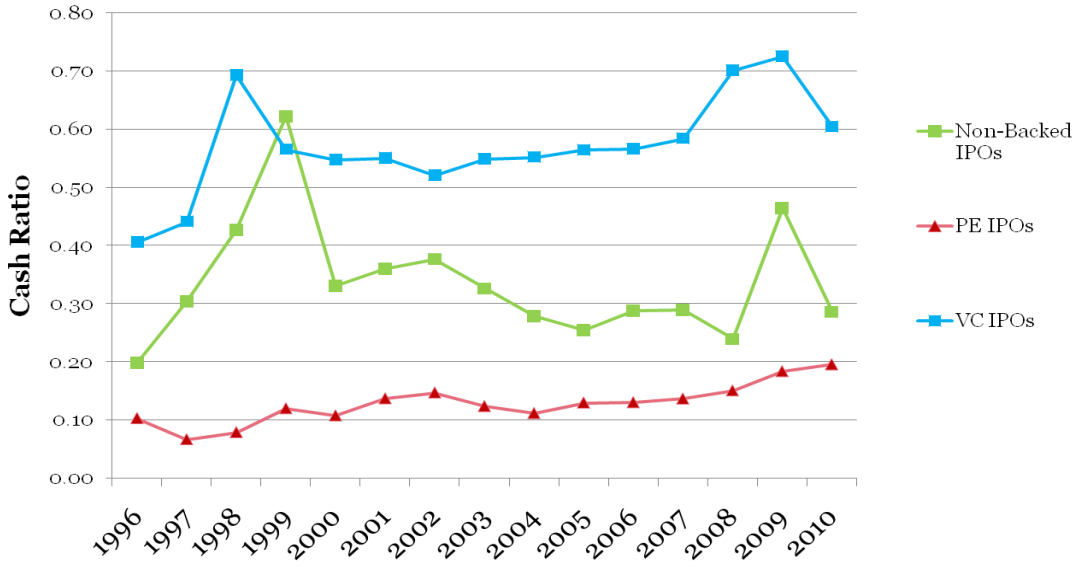
Table 10. Endogeneity Tests

Table 10 reports the results of endogeneity tests. I use instrumental variables approach. The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable is equal to PE/VC ownership retention in Model [1] and [3], whereas the dependent variable is the three year market-adjusted BHARs. In Model [2], the equation is estimated with low proximity dummy as an instrument for PE syndicate ownership retention. Low proximity dummy equals 1 if PE/VC lead fund's headquarters and IPO company are located in different countries (i.e. low geographic proximity dummy), and 0 otherwise. In Model [4], the equation is estimated with syndicate size as an instrument for VC syndicate ownership retention. Syndicate size is defined as the number of different VC investors listed in the "Major Shareholders" section of IPO prospectus. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

PE-Backed IPOs	First Stage [1]	2SLS [2]	**VC-Backed IPOs**	First Stage [3]	2SLS [4]
INTERCEPT	0.97***	-2.40*	INTERCEPT	0.23	-0.73
	[3.62]	[-1.88]		[0.81]	[-0.73]
RETENTION IV: LOW PROXIMITY DUMMY	-0.25***	0.52	RETENTION IV: SYNDICATE SIZE	0.02***	-0.86
	[-3.48]	[0.53]		[3.14]	[-0.83]
IND. ADJ. CASH RATIO$_{IPO\ YEAR+1}$	0.14	-4.54**	IND. ADJ. CASH RATIO$_{IPO\ YEAR+1}$	-0.09***	-0.13
	[0.23]	[-2.15]		[-3.68]	[-0.98]
IND.ADJ.CASH RATIO$_{IPO\ YEAR+1}$ * PE/VC RETENTION DUMMY	-0.12	4.35**	IND.ADJ.CASH RATIO$_{IPO\ YEAR+1}$ * PE/VC RETENTION DUMMY	0.85***	0.93
	[-0.20]	[2.00]		[11.55]	[0.98]
FDR	0.01	-0.36***	FDR	-0.02	-0.14*
	[0.02]	[-2.71]		[-0.86]	[-1.84]
SIZE$_{IPO\ YEAR+1}$	0.01	0.47***	SIZE$_{IPO\ YEAR+1}$	0.02	0.64***
	[0.03]	[3.92]		[0.85]	[7.38]
M/B$_{IPO\ YEAR+1}$	0.01	0.00	M/B$_{IPO\ YEAR+1}$	0.00	0.00
	[0.24]	[-0.17]		[-1.12]	[0.07]
LEV$_{IPO\ YEAR+1}$	0.01	-0.09	LEV$_{IPO\ YEAR+1}$	0.27**	0.46
	[0.22]	[-0.97]		[2.29]	[0.98]
PE VC LOCK-UP DUR.	0.01	0.00	PE VC LOCK-UP DUR.	0.00	-0.01
	[0.23]	[0.99]		[-1.38]	[-1.62]

UNDERW. REPUTATION	0.01	-0.10	UNDERW. REPUTATION	0.01	-0.04
	[0.03]	[-1.58]		[0.60]	[-0.79]
MGT $OWN_{IPO\ YEAR+1}$	0.12	-0.04	MGT $OWN_{IPO\ YEAR+1}$	0.11	-0.56
	[0.76]	[-0.07]		[0.89]	[-1.45]
IBH $OWN_{IPO\ YEAR+1}$	0.19	1.06	IBH $OWN_{IPO\ YEAR+1}$	0.20	0.42
	[0.61]	[1.03]		[0.70]	[0.45]
FIRM AGE	0.01	0.02	FIRM AGE	0.02	0.05
	[0.34]	[0.30]		[0.68]	[0.57]
INDUSTRY DUMMIES	YES	YES	INDUSTRY DUMMIES	YES	YES
YEAR DUMMIES	YES	YES	YEAR DUMMIES	YES	YES
No of Obs.	126	126	No of Obs.	429	429
Adjusted R^2	24.02%	47.07%	Adjusted R^2	43.61%	12.64%

Figures for Empirical Study 3
Figure 3.1: Annual Cash Ratio for Backed and Non-Backed IPOs



Appendices for Empirical Study 3.

Appendix 1. Description of Proxy Variables.

All USD Dollars values are deflated to 2005 dollars. All continuous variables are winsorized at the 1% and 99% levels.

Variables	Definition
Sub-samples:	
Backed IPOs or financially sponsored IPOs	Firms which had a private equity (PE) or venture capital (VC) investor listed as a major shareholder immediately before the flotation in IPO prospectus.
Retained IPOs	Those backed IPOs in which PE/VC syndicates have maintained some ownership at first quarter post lockup expiration date.
Exited IPOs	Those backed firms in which PE/VC investors have sold all their equity stake at first quarter post lockup expiration date.
Proxy Variables Used to Test Hypotheses:	
Cash Ratio	Defined as cash and short-term investments over total assets.
IND. ADJ. CASH RATIO	Industry-adjusted cash ratio is defined as the firm's cash ratio minus relevant industry median cash ratio.
RETENTION DUMMY	Dummy variable that equals 1 if at first quarter post-unlock day PE/VC syndicates have retained some equity stake, and 0 if PE/VC syndicates have conducted a full exit (i.e. sold all shares).
PE/VC VOL OWN	The proportion of the firm's shares held by PE or VC syndicate as a group voluntarily at time t, specified in decimals.
Fund and Syndicate Characteristics:	
SYNDICATE SIZE	Number of different PE/VC investors listed in the "Major Shareholders" section of IPO prospectus.
LARGE SYND. DUMMY	Dummy variable that equals 1 if the syndicate size is larger than PE or VC sample median respectively.
BANK AFFILIATED DUMMY	Dummy variable that equals 1 if PE/VC fund investor type is an Investment Bank or Other Banking/ Financial Institution, and 0 otherwise (Corporate PE/Venture Fund, Evergreen, Independent Private Partnership, and Investment Advisory Affiliate).
Financial Constraints Measures:	
WW Index	The Whited and Wu (2006) index, which is calculated every year for each firm as follows: WW $index_{it}$ = -0.091*Cash $Flow_{it}$ - 0.062*Dividend $Dummy_{it}$ + 0.021*$Leverage_{it}$ - 0.044*$Size_{it}$ + 0.102*Industry Sales $Growth_{it}$ - 0.035*Sales $Growth_{it.,}$ where Cash $Flow_{it}$ is operating income plus depreciation (Item 14 + Item 18) divided by lagged total assets; Dividend $Dummy_{it}$ is a binary variable that equals 1 if the firm pays dividends,

KZ Index	and 0 otherwise; $Leverage_{it}$ is the ratio of long-term debt (Item 9) over total assets; $Size_{it}$ is the natural logarithm of total assets; Industry Sales $Growth_{it}$ is two-digit SIC industry average of sales growth; Sales $Growth_{it}$ is annual percentage change in sales. The Kaplan and Zingales (1997) index, which is calculated as in Baker *et al* (2003): KZ $Index_{it}$ = -1.002* Cash $Flow_{it}$ - 39.368*$Dividends_{it}$ - 1.315*$Cash_{it}$ + 3.139*$Leverage_{it}$ + 0.283*Q_{it} , where Cash $Flow_{it}$ is cash flow (Item 18 and Item 14) over lagged total assets; $Dividends_{it}$ is total cash dividend (Item 21 and Item 19) over lagged total assets; $Cash_{it}$ is cash and short-term investments (Item 1) over lagged total assets; $Leverage_{it}$ is calculated as total debt (Item 9 + Item 34) over total debt plus stockholders' equity (Item 9+ Item 34 + Item 216); Q_{it} is market value of equity plus book value of total assets minus book value of equity over book value of total assets.
Dividend Payout Ratio	Calculated as the ratio of dividends to earnings.
'Div. Payout - Constrained'	Dummy variable that equals 1 if the firm has not paid a dividend in year t, and 0 otherwise.
DIV DUMMY	Dummy variable that equals 1 if the firm pays some dividend in a particular year, and 0 otherwise.
Control Variables:	
MGT OWN (%)	Management ownership is defined as the percentage of outstanding shares held by the management team.
IBH OWN (%)	Institutional pre-IPO investors' ownership is defined as the percentage of outstanding shares held by institutional investors as a group.
UNDERW. REPUTATION	Underwriter reputation dummy variable that equals 1 if the underwriter is the global underwriter, and 0 otherwise as defined in Derrien and Kecskes (2007).
PE DUMMY	Dummy variable that equals 1 if an IPO is classified as private-equity backed, and 0 if venture capital backed. For IPOs floated between 1997 and 2007, names of PE and VC-backed IPOs were taken from Liu and Ritter (2011). For IPOs floated between 2008 and 2010, SDC Platinum Database was used to collect the names of backed IPOs.
FIRM AGE	Difference between IPO year and firm's incorporation year. Firm age data was gathered from Jay Ritter website. In regressions, it is defined as the natural logarithm of one plus the IPO firm's age in a particular year.
SIZE	Total assets, specified in USD million. In regressions, it is defined as the natural logarithm of total assets.
ACQ	Acquisition expenditure scaled by total assets. If missing, this variable is set to zero.
CAPEX	Capital expenditure scaled by total assets. If missing, this variable is set to zero.
CF	Operating cash flows scaled by total assets.
R&D	Research & Development expenditure scaled by total assets. If missing, this variable is set to zero.

NWC	Net working capital scaled by total assets. Net working capital is defined as current assets minus current liabilities and cash.
M/B	Market-to-book ratio is calculated as the market value of equity divided by book value.
LEV	Leverage is defined as total debt scaled by total assets.
SALES G	Sales growth which is defined as the change in sales.
Underpricing (FDR)	Calculated as the ratio of the difference between closing price at the first day of trading and offer price divided by the offer price.
Market adjusted buy-and-hold abnormal returns (BHARs)	Calculated by computing the company's one, two, three year buy-and-hold return and subtracting one, two, three year market buy-and-hold return. For companies listed on the NYSE (NASDQ) market, S&P 500 price index (NASDQ All-Share price index) is used to calculate market buy-and-hold return.
NASDAQ QUOTED	Dummy variable that equals 1 if the company is floated on the Nasdaq market, and 0 otherwise.
HIGH-TECH DUMMY	Dummy variable that equals 1 if the company belongs to the following industries: technology, health care and telecommunications.

Appendix 2. Cash Ratio for US IPOs Using Alternative Definitions of Cash Ratio.

The sample consists of 579 non-backed and 1346 backed IPOs which have been floated on the US stock markets during 1997 and 2010. Cash Ratio is defined as cash and short-term investments over sales (*Panel A*), and cash and short-term investments over net assets (*Panel B*). "Backed IPO" are those firms which had a private equity (PE) or venture capital (VC) investor listed as a major shareholder immediately before the flotation in IPO prospectus. In *Panel A*, mean and median cash ratio for non-backed (NB), PE- and VC-backed IPOs are presented. For years t-1 and t=0, all NB and PE/VC IPOs are considered. For t+1, t+2, t+3, mean and median cash ratios for all NB IPOS are presented, whereas for PE and VC IPOs only those firms retained by financial sponsors in corresponding year post-flotation are considered in the analysis. In *Panel B*, descriptive statistics of backed IPOs are presented. "Retained IPOs" are those IPOs in which PE/VC syndicates have maintained some ownership at first quarter post lockup expiration date, and "Exited IPOs" are those firms in which PE/VC investors have sold all their equity stake at first quarter post lockup expiration date. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Cash Ratios of Backed and Non-Backed IPOs

Years around IPO Year	**Non Backed IPOs** [1]		**PE-Backed IPOs** [2]		**VC-Backed IPOs** [3]		**Differences** [1]-[2]		[1]-[3]		[2]-[3]	
	Mean	Median	Mean	Median	Mean	Median	t-stat	MW	t-stat	MW	t-stat	MW
t-1	1.48	0.15	0.25	0.06	3.05	0.44	3.32***	[0.00]	-2.92***	[0.00]	-4.95***	[0.00]
t=0	4.53	0.38	0.35	0.10	6.16	1.41	3.74***	[0.00]	-1.38	[0.00]	-5.85***	[0.00]
t+1	2.21	0.26	0.26	0.10	3.80	1.16	2.74***	[0.00]	-2.26**	[0.00]	-5.92***	[0.00]
t+2	1.38	0.27	0.26	0.10	3.12	0.87	4.03***	[0.00]	-3.62***	[0.00]	-5.64***	[0.00]
t+3	1.11	0.24	0.22	0.10	3.61	0.77	3.20***	[0.00]	-3.38***	[0.00]	-4.25***	[0.00]

Panel B. Cash Ratios of Backed and Non-Backed IPOs

Years around IPO Year	**Non Backed IPOs** [1]		**PE-Backed IPOs** [2]		**VC-Backed IPOs** [3]		**Differences** [1]-[2]		[1]-[3]		[2]-[3]	
	Mean	Median	Mean	Median	Mean	Median	t-stat	MW	t-stat	MW	t-stat	MW
t-1	0.96	0.16	0.14	0.05	2.06	0.08	5.23***	[0.00]	-4.90***	[0.00]	-8.16***	[0.00]
t=0	1.95	0.41	0.30	0.08	3.92	2.01	6.11***	[0.00]	-6.26***	[0.00]	-12.27***	[0.00]
t+1	1.14	0.25	0.27	0.08	2.84	1.43	3.87***	[0.00]	-6.65***	[0.00]	-10.16***	[0.00]
t+2	0.81	0.21	0.24	0.09	2.76	1.15	3.92***	[0.00]	-6.53***	[0.00]	-7.61***	[0.00]
t+3	0.83	0.22	0.23	0.08	2.97	1.09	4.15***	[0.00]	-5.13***	[0.00]	-5.93***	[0.00]

Appendix 3. Aftermarket Performance of PE- and VC-Backed IPOs (excluding IPOs quoted during the Dot Com Bubble).

The sample consists of 379 PE- and 516 VC-backed IPOs floated on the U.S. stock markets. All admissions which have taken place during the bubble period (i.e. January 1999-December 2000) were excluded from the sample. Summary statistics of underpricing, buy-and-hold return, and market-adjusted buy-and-hold abnormal returns are reported. 'High cash ratio' is defined as those firms whose cash ratio at one year post-IPO is higher than industry-median in a particular year. 'Low Cash Ratio' is defined as those firms whose cash ratio at one year post-IPO is lower than industry-median in a particular year. 'Retained IPOs' are those IPOs in which PE/VC syndicates have maintained some ownership at first quarter post lockup expiration date, and 'Exited IPOs' are those firms in which PE/VC investors have sold their entire equity stake at first quarter post lockup expiration date. *Panel A* presents performance descriptive statistics of PE-Backed IPOs. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively. Statistical significance of the difference in means and medians between various samples are reported by [a], [b] and [c], which denote statistical significance at the 1, 5, and 10 percent levels, respectively. In column [1], [a], [b] and [c], refer to the statistical difference between PE high cash ratio retained and exited IPOs ([1]-[2]). In column [3], [a], [b] and [c], refer to the statistical difference between PE low cash retained and exited IPOs ([3]-[4]). *Panel B* presents summary statistics for VC-Backed IPOs. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively. Statistical significance of the difference in means and medians between various samples are reported by [a], [b] and [c], which denote statistical significance at the 1, 5, and 10 percent levels, respectively. In column [5], [a], [b] and [c], refer to the statistical difference between VC high cash ratio retained and exited IPOs ([5]-[6]). In column [7], [a], [b] and [c], refer to the statistical difference between VC low cash retained and exited IPOs ([7]-[8]).

Panel A. Performance of PE-Backed IPOs

	High Cash Ratio		**Low Cash Ratio**		**Differences**	
	Retention	**Exit**	**Retention**	**Exit**	**t-stats**	
	[1]	[2]	[3]	[4]	[1]-[3]	[2]-[4]
Underpricing:						
1st Day	0.60	2.19	-4.13[c]	-14.58	*0.95*	*1.72**
Buy-and-hold Returns:						
1 year	9.88	-6.14	3.77	0.88	*0.72*	*-0.62*
2 years	6.10	-15.86	-0.34	0.57	*0.55*	*-0.75*
3 years	-11.96	-26.63	-17.48[a]	19.28	*0.50*	*-1.36*
Market-Adjusted Buy-and-hold Returns:						
1 year	5.66	-10.96	0.38	-6.27	*0.67*	*-0.44*
2 years	-4.46	-21.25	-8.89	-16.20	*0.45*	*-0.29*
3 years	-10.78	-23.78	-19.76[a]	7.12	*0.88*	*-1.14*

Panel B. Performance of VC-Backed IPOs

	High Cash Ratio		Low Cash Ratio		Differences	
	Retention	Exit	Retention	Exit	t-stats	
	[5]	[6]	[7]	[8]	[5]-[7]	[6]-[8]
Underpricing:						
1st Day	4.92	12.30	7.86[c]	-3.54	*-0.48*	*2.18***
Buy-and-hold Returns:						
1 year	-8.86[a]	10.60	-24.64	-1.93	*1.85**	*0.61*
2 years	3.85[a]	60.69	-27.00	16.71	*1.32*	*0.99*
3 years	-6.21	9.03	-56.39[c]	83.74	*1.96***	*-1.04*
Market-Adjusted Buy-and-hold Returns:						
1 year	-12.51[c]	1.88	-30.44	-14.49	*2.25***	*0.84*
2 years	-24.33[b]	11.06	-45.20	-33.28	*1.54*	*1.35*
3 years	-30.68	-30.80	-68.76	19.33	*2.48****	*-0.90*

Appendix 4. Multivariate Analysis of the Cash Ratio Using Alternative Definitions.

The following table presents results of multivariate analysis of backed IPOs' cash ratio. The sample consists of 3600 firm year observations for 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable in Models [1] through [6] is defined as the natural logarithm of cash ratio (cash and short-term investments over sales) one, two and three years post-flotation. The dependent variable in Models [7] through [12], is defined as the natural logarithm of cash ratio (cash and short-term investments over net assets) one, two and three years post-flotation. In Panel A, individual effects of PE and VC ownership retention, fund characteristics and financial constraints are examined. In Panel B, the interaction effects on cash holdings of PE- and VC-backed IPOs are analyzed. All USD Dollars values are deflated to 2005 dollars. All continuous variables are winsorized at the 1% and 99% levels. t-statistics are reported in brackets. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Individual Effects with Two Alternative Definitions of the Cash Ratio

	Cash Ratio=(Cash + Short-term Investments)/Sales						Cash Ratio=(Cash + Short-term Investments)/Net Assets					
	All Backed IPOs		PE-Backed IPOs		VC-Backed IPOs		All Backed IPOs		PE-Backed IPOs		VC-Backed IPOs	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
INTERCEPT	-0.40	-0.93*	-3.57***	-3.66***	-0.06	0.35	1.57***	1.00**	-1.68***	-2.03***	1.22***	1.03*
	[-0.91]	[-1.94]	[-5.58]	[-4.79]	[-0.09]	[0.48]	[3.92]	[2.23]	[-2.70]	[-2.52]	[2.32]	[1.64]
PE DUMMY	-1.44***	-1.38***					-1.19***	-1.13***				
	[-14.75]	[-11.87]					[-13.16]	[-10.49]				
RETENTION DUMMY	0.43***		-0.12		0.81***		0.32***		-0.1		0.52***	
	[5.16]		[-0.85]		[7.87]		[4.24]		[-0.79]		[6.00]	
VOLUNTARY OWN		0.06		-0.90***		1.09***		-0.14		-0.92***		0.87***
		[0.29]		[-3.48]		[3.84]		[-0.79]		[-3.80]		[3.64]
BANK AFFILIATED DUMMY	-0.32***	-0.19	-0.73***	-0.69***	-0.11	-0.02	-0.20*	-0.09	-0.73***	-0.73***	0.03	0.08
	[-2.51]	[-1.30]	[-3.33]	[-2.81]	[-0.75]	[-0.12]	[-1.76]	[-0.69]	[-3.40]	[-3.11]	[0.27]	[0.57]
LARGE SYND. DUMMY	0.28***	0.34***	0.30***	0.38***	0.24***	0.28***	0.32***	0.39***	0.27***	0.41***	0.32***	0.36***
	[4.28]	[4.41]	[2.61]	[2.98]	[3.04]	[2.98]	[5.29]	[5.62]	[2.47]	[3.38]	[4.90]	[4.54]
FIN. CONSTRAINT INDEX	-0.01	-0.01	0.01	0.01	-0.01	-0.01	-0.01	-0.01	0.01	0.01	-0.01	-0.01
	[-1.09]	[-0.80]	[0.75]	[0.51]	[-1.40]	[-1.01]	[-0.63]	[-0.37]	[1.03]	[0.83]	[-1.05]	[-0.68]
SIZE	-0.01	0.03	0.06	0.17***	-0.02	0.01	-0.37***	-0.32***	-0.30***	-0.21***	-0.26***	-0.21***
	[-0.21]	[0.77]	[1.20]	[2.73]	[-0.43]	[-0.06]	[-12.15]	[-8.93]	[-5.75]	[-3.48]	[-6.84]	[-4.88]
M/B	-0.01	-0.01	-0.01	-0.01	0.01***	0.01***	-0.01	-0.01	-0.01	-0.01	0.01***	0.01***

	[-0.75]	[-0.89]	[-1.51]	[-1.35]	[3.06]	[2.46]	[-0.67]	[-0.81]	[-1.22]	[-1.00]	[3.97]	[2.86]
CF	-0.67***	-0.56***	0.77	0.87	-0.49***	-0.37**	0.45***	0.39**	2.78***	2.96***	-0.07	-0.11
	[-4.17]	[-3.14]	[1.22]	[1.20]	[-2.97]	[-1.98]	[2.93]	[2.27]	[4.58]	[4.34]	[-0.45]	[-0.66]
NWC	-0.11	-0.07	-1.39***	-1.41***	0.04	0.02	-1.36***	-1.27***	-1.41***	-1.22***	-1.47***	-1.50***
	[-0.93]	[-0.53]	[-4.80]	[-4.17]	[0.28]	[0.13]	[-7.42]	[-6.19]	[-3.64]	[-2.82]	[-7.72]	[-6.95]
R&D	0.53**	0.72***	5.41***	8.71***	0.48**	0.58**	0.55***	0.68***	6.07***	8.86***	0.02	0.06
	[2.19]	[2.67]	[3.33]	[4.56]	[2.00]	[2.11]	[2.40]	[2.64]	[3.89]	[4.94]	[0.10]	[0.23]
CAPEX	-1.06**	-0.87	0.21	0.34	-0.97	-0.8	-2.86***	-2.40***	-1.49**	-1.49*	-3.01***	-2.36***
	[-2.15]	[-1.48]	[0.27]	[0.38]	[-1.49]	[-1.00]	[-6.15]	[-4.33]	[-1.97]	[-1.76]	[-5.39]	[-3.40]
ACQ	-0.52***	-0.42***	-2.03***	-1.71***	-0.31**	-0.27*	-3.33***	-2.93***	-2.19***	-2.00***	-3.36***	-3.02***
	[-3.87]	[-3.01]	[-3.70]	[-2.60]	[-2.14]	[-1.73]	[-11.11]	[-8.54]	[-4.14]	[-3.25]	[-10.00]	[-7.94]
DIV DUMMY	0.27**	0.33**	0.29**	0.29*	0.24	0.3	0.27***	0.38***	0.34***	0.41***	0.11	0.08
	[2.25]	[2.24]	[2.00]	[1.71]	[1.15]	[1.08]	[2.49]	[2.81]	[2.46]	[2.52]	[0.63]	[0.36]
LEV	0.11	0.11	0.14	0.12	-0.19	-0.19	-0.09	-0.08	0.12	0.11	-2.82***	-2.72***
	[1.57]	[1.43]	[1.57]	[1.14]	[-1.31]	[-1.18]	[-1.29]	[-1.03]	[1.37]	[1.17]	[-12.85]	[-11.24]
SALES G	-0.15***	-0.12***	-0.49***	-0.52***	-0.13***	-0.09*	0.19***	0.18**	-0.14	-0.41**	0.16**	0.24***
	[-3.21]	[-2.44]	[-2.66]	[-2.65]	[-2.76]	[-1.77]	[2.47]	[1.98]	[-0.81]	[-2.16]	[2.05]	[2.56]
FIRM AGE	-0.32***	-0.31***	-0.25***	-0.27***	-0.50***	-0.46***	-0.24***	-0.22***	-0.20***	-0.24***	-0.26***	-0.18**
	[-7.18]	[-5.45]	[-4.51]	[-3.94]	[-6.55]	[-4.62]	[-5.79]	[-4.28]	[-3.79]	[-3.67]	[-3.94]	[-2.17]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
No of Obs.	2356	1732	854	627	1502	1105	2360	1732	849	623	1511	1109
Adjusted R^2	47.46%	45.75%	32.33%	35.37%	31.36%	30.06%	57.07%	55.43%	31.24%	34.36%	45.55%	44.09%

Panel B. Interaction Effects with Two Alternative Definitions of the Cash Ratio

	Cash Ratio=(Cash + Short-term Investments)/Sales						Cash Ratio=(Cash + Short-term Investments)/Net Assets					
	All Backed IPOs		PE-Backed IPOs		VC-Backed IPOs		All Backed IPOs		PE-Backed IPOs		VC-Backed IPOs	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
INTERCEPT	-0.34	-0.94*	-3.57***	-3.67***	0.05	0.36	1.64***	1.00**	-1.68***	-2.04***	1.32***	1.05*
	[-0.77]	[-1.95]	[-5.56]	[-4.79]	[0.08]	[0.50]	[4.09]	[2.23]	[-2.69]	[-2.53]	[2.52]	[1.66]
PE DUMMY	-1.43***	-1.38***					-1.18***	-1.13***				
	[-14.67]	[-11.86]					[-13.07]	[-10.48]				
RETENTION DUMMY	0.36***		-0.13		0.72***		0.25***		-0.10		0.44***	
	[4.16]		[-0.89]		[6.71]		[3.14]		[-0.76]		[4.82]	
VOLUNTARY OWN		0.01		-0.91***		1.19***		-0.18		-0.94***		0.97***
		[0.07]		[-3.44]		[3.76]		[-0.99]		[-3.75]		[3.62]
FIN. CONSTRAINT INDEX	-0.01***	-0.01	-0.01	-0.01	-0.01***	-0.01	-0.01***	-0.01	0.01	0.01	-0.01***	-0.01
	[-2.96]	[-1.11]	[-0.06]	[-0.03]	[-2.86]	[-0.44]	[-3.38]	[-0.79]	[0.30]	[0.11]	[-3.17]	[-0.12]
FIN. CONSTRAINT INDEX*RETENTION	0.01***		0.01		0.01***		0.01***		0.01		0.01***	
	[2.84]		[0.29]		[2.72]		[3.33]		[0.00]		[3.07]	
FIN. CONSTRAINT INDEX*VOLUNTARY OWN		0.01		0.01		-0.01		0.01		0.01		-0.01
		[0.81]		[0.25]		[-0.71]		[0.91]		[0.24]		[-0.80]
BANK AFFILIATED DUMMY	-0.31***	-0.20	-0.73***	-0.69***	-0.10	-0.01	-0.20*	-0.10	-0.73***	-0.73***	0.04	0.09
	[-2.45]	[-1.37]	[-3.33]	[-2.79]	[-0.70]	[-0.07]	[-1.69]	[-0.77]	[-3.40]	[-3.08]	[0.33]	[0.61]
LARGE SYND. DUMMY	0.28***	0.34***	0.30***	0.38***	0.24***	0.28***	0.32***	0.39***	0.27***	0.41***	0.33***	0.36***
SIZE	-0.01	0.03	0.06	0.17***	-0.02	-0.01	-0.37***	-0.32***	-0.30***	-0.21***	-0.26***	-0.22***
	[-0.23]	[0.79]	[1.21]	[2.74]	[-0.54]	[-0.10]	[-12.21]	[-8.90]	[-5.75]	[-3.45]	[-6.99]	[-4.92]
M/B	0.00	0.00	0.00	0.00	0.01***	0.01***	0.00	0.00	0.00	0.00	0.01***	0.01***
	[-0.75]	[-0.87]	[-1.51]	[-1.34]	[3.15]	[2.46]	[-0.68]	[-0.79]	[-1.22]	[-0.99]	[4.07]	[2.85]
CF	-0.68***	-0.57***	0.76	0.88	-0.49***	-0.37*	0.45***	0.39**	2.78***	2.98***	-0.06	-0.11

	[-4.21]	[-3.16]	[1.21]	[1.21]	[-2.99]	[-1.95]	[2.90]	[2.25]	[4.57]	[4.34]	[-0.42]	[-0.62]
NWC	-0.12	-0.07	-1.37***	-1.41***	0.03	0.02	-1.38***	-1.26***	-1.41***	-1.21***	-1.50***	-1.51***
	[-1.00]	[-0.52]	[-4.79]	[-4.16]	[0.21]	[0.12]	[-7.54]	[-6.15]	[-3.64]	[-2.79]	[-7.87]	[-6.97]
R&D	0.50**	0.71***	5.39***	8.73***	0.45*	0.58**	0.52**	0.67***	6.07***	8.88***	-0.01	0.06
	[2.09]	[2.63]	[3.31]	[4.56]	[1.88]	[2.14]	[2.27]	[2.62]	[3.88]	[4.94]	[-0.03]	[0.26]
CAPEX	-1.08**	-0.86	0.21	0.34	-1.02	-0.80	-2.88***	-2.39***	-1.49**	-1.49*	-3.04***	-2.37***
	[-2.19]	[-1.47]	[0.27]	[0.38]	[-1.57]	[-1.00]	[-6.21]	[-4.32]	[-1.97]	[-1.76]	[-5.46]	[-3.41]
ACQ	-0.52***	-0.42***	-2.04***	-1.70***	-0.32**	-0.26*	-3.33***	-2.93***	-2.19***	-2.00***	-3.35***	-3.02***
	[-3.88]	[-3.03]	[-3.70]	[-2.59]	[-2.18]	[-1.71]	[-11.13]	[-8.56]	[-4.13]	[-3.24]	[-10.01]	[-7.93]
DIV DUMMY	0.26**	0.33**	0.29**	0.29*	0.21	0.30	0.26***	0.38***	0.34***	0.41***	0.08	0.09
	[2.15]	[2.24]	[1.99]	[1.70]	[1.00]	[1.09]	[2.37]	[2.82]	[2.46]	[2.51]	[0.45]	[0.37]
LEV	0.11	0.12	0.14	0.12	-0.17	-0.19	-0.09	-0.08	0.12	0.12	-2.78***	-2.73***
	[1.61]	[1.47]	[1.57]	[1.14]	[-1.19]	[-1.19]	[-1.27]	[-0.98]	[1.37]	[1.18]	[-12.68]	[-11.26]
SALES G	-0.15***	-0.12***	-0.47***	-0.52***	-0.13***	-0.09*	0.18***	0.18**	-0.14	-0.41**	0.15*	0.24***
	[-3.26]	[-2.43]	[-2.65]	[-2.65]	[-2.81]	[-1.77]	[2.36]	[2.01]	[-0.81]	[-2.15]	[1.94]	[2.55]
FIRM AGE	-0.33***	-0.31***	-0.25***	-0.27***	-0.50***	-0.46***	-0.25***	-0.22***	-0.20***	-0.24***	-0.26***	-0.18**
	[-7.32]	[-5.44]	[-4.51]	[-3.94]	[-6.57]	[-4.60]	[-5.94]	[-4.26]	[-3.78]	[-3.67]	[-3.96]	[-2.15]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
No of Obs.	2356	1732	854	627	1502	1105	2360	1732	849	623	1511	1109
Adjusted R^2	47.80%	45.76%	32.34%	35.37%	31.70%	30.10%	57.26%	55.42%	31.15%	34.25%	45.86%	44.07%

Appendix 5. Backed IPOs' Median Financial Constraints.

Appendix 5 presents median financial constraints by PE/VC ownership for the two samples of IPOs pre-flotation, 1, 2, and 3 years post-flotation (*Panel A*). Ownership terciles for PE and VC samples are redefined every year. It presents p-values for difference-in-medians (Mann-Whitney rank-sum test) between top and bottom ownership terciles for PE and VC samples. *Panel B* presents p-values for difference-in-medians (Mann-Whitney rank-sum test) between current time period and last time period. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Median Financial Constraint by PE and VC Ownership.

	Ownership Terciles	**PE-Backed IPOs** KZ Index	**PE-Backed IPOs** WW Index	**VC-Backed IPOs** KZ Index	**VC-Backed IPOs** WW Index
[1]	Top Tercile: PE/VC Ownership$_{pre\text{-}IPO}$		1.22		6.47
[2]	Bottom Tercile: PE/VC Ownership$_{pre\text{-}IPO}$		2.19		4.77
	Difference [1]-[2]		*[0.21]*		*[0.42]*
[3]	Top Tercile: PE/VC Ownership$_{t+1}$	1.35	1.33	-0.29	6.09
[4]	Bottom Tercile: PE/VC Ownership$_{t+1}$	0.76	1.57	-0.58	5.91
	Difference [3]-[4]	*[0.02]*	*[0.38]*	*[0.51]*	*[0.73]*
[5]	Top Tercile: PE/VC Ownership$_{t+2}$	1.52	0.55	-0.40	11.66
[6]	Bottom Tercile: PE/VC Ownership$_{t+2}$	1.10	1.57	-0.42	4.36
	Difference [5]-[6]	*[0.04]*	*[0.02]*	*[0.76]*	*[0.00]*
[7]	Top Tercile: PE/VC Ownership$_{t+3}$	1.61	1.07	-0.49	10.60
[8]	Bottom Tercile: PE/VC Ownership$_{t+3}$	0.70	1.13	-0.44	4.64
	Difference [7]-[8]	*[0.04]*	*[0.28]*	*[0.89]*	*[0.06]*

Panel B. Differences-in-medians (MW) between current time period and last period.

	PE-Backed IPOs		**VC-Backed IPOs**	
	KZ Index	WW Index	KZ Index	WW Index
Top Tercile				
Difference [3]-[1]		[0.90]		[0.49]
Difference [5]-[3]	[0.38]	[0.04]	[0.85]	[0.00]
Difference [7]-[5]	[0.95]	[0.59]	[0.31]	[0.58]
Bottom Tercile				
Difference [4]-[2]		[0.52]		[0.21]
Difference [6]-[4]	[0.40]	[0.82]	[0.56]	[0.27]
Difference [8]-[6]	[0.90]	[0.51]	[0.37]	[0.10]

Chapter 5: Conclusion

The capital provided by PE and VC houses represents a distinctive type of financing available to firms, in contrast to debt financing and equity from entrepreneurs. Following the initial funding, these financial sponsors monitor, support, certify, restructure, and create value in firms. These investors realize returns by bringing portfolio firms to the stock market in the form of initial public offerings (among other exit routes). However, in practice financial sponsors do not sell all of their shares. They maintain a block holding, which allows them to remain active investors in the post-flotation period.

This dissertation contributes to private equity, venture capital and IPO literature by investigating financial sponsors' involvement in shaping various corporate policies and ability to create value in the post-IPO period. It is of great importance to other market participants to understand why these investors carry on investing in firms they brought to the market and whether such holdings create or destroy value. In the first study, I examine the reason behind PE and VC investors' decision to continue holding shares. In the second and third empirical study, I investigate the effect of retained equity on a set of inter-linked corporate policies which directly affect firm value. I analyse financially sponsored IPOs' cash reserves, which, as documented in previous studies, can lead to significant agency conflicts. In addition, this thesis contributes to the literature on PE and VC investing by reporting new insights into the significant, long lasting effect of PE/VC fund and syndicate characteristics on monitoring styles, divestment strategy, portfolio firm performance, expenditures and corporate cash reserves.

Research in this area is highly warranted because financial intermediaries, such as PE and VC investors, play a vital role in US economy by fostering

entrepreneurial firms in the international context. In addition, PE and VC are prime drivers of IPO activity in the US and globally, which assumed greater importance in recent years. There is a robust pipeline of financially-sponsored IPOs coming in the near future, which is driven by improved IPO conditions, economic fundamentals and investors' confidence (Ernst and Young, 2014).

5.1 Main Findings

In the first empirical study, I investigate what drivers PE and VC investors' compulsory and voluntary equity holdings in the UK and US. To answer this question, I use a sample of IPOs floated on the two 'Anglo-Saxon' markets of quotation between 1997 and 2010. I test the monitoring and signalling hypotheses, and conclude that financial sponsors' equity retention (voluntary and compulsory) is used to mitigate potential managerial expropriation of outside shareholders. This paper extends the literature on IPOs' performance by demonstrating that backed IPOs which are fully exited by financial sponsors' syndicate at the lockup expiration outperform their retained peers in the aftermarket. Within the latter type of firms, I present evidence that there is a convex relationship between financial sponsors' voluntary ownership and firm value. The results demonstrate that the differences in institutional setting between UK and US have significant effects on financial sponsors' propensity and extent of post-IPO equity concentration: financial sponsors are required to retain significantly higher ownership in US than UK backed IPOs.

The second empirical study examines whether PE and VC investors continue to shape corporate policies in the post-flotation period, and whether it creates value in the long-run. An IPO is a corporate event characterized by a significant change in firm's corporate governance, expanded ownership base as a result of new investors,

increased scrutiny of the market and significantly reduced financial sponsors' initial ownership. Hence, it is of great interest to understand whether in such environment financial sponsors are able to influence and, more importantly, create value in partially exited portfolio firms. I document that PE and VC investors are heavily involved in defining the firm's board of directors, spending patterns and payout initiation mechanism in the post-flotation period. I present evidence that the previously reported inverse relationship between Tobin's Q and board size (Yermack, 1996) does not universally hold: board size has a positive association with firm value of retained VC firms. VC investors choose to minimize the firm's post-IPO spending on capital assets and acquisitions, and in cases when PE investors' monitoring abilities are constrained by distance. I also find that backed IPOs prefer to initiate payouts via cash dividends. I report that venture capitalists create value in the long-run by shaping the boards' of directors and spending patterns, however they destroy value by not initiating payouts. PE investors' post-IPO ownership does not affect firm value, and their IPOs make value destroying capital expenditures.

The third empirical study contributes to the literature by investigating whether PE and VC investors' post-IPO ownership partly explains the rapidly increasing US corporate cash reserves. There is a considerable void in the extant literature on the contribution of financially sponsored IPOs to this phenomenon. I find that several existing theories (transaction, precautionary, monitoring and agency) partly explain cash reserves of backed IPOs. I find that VC firms hold a higher proportion of assets in cash in comparison to PE-backed companies, which is explained by portfolio firms' fundamentally different growth opportunities. I demonstrate that in PE- (VC-) backed IPOs there is a significant negative (positive) relationship between financial sponsors' equity retention and cash reserves, which is driven by PE firms' agency conflicts and

VC firms' high growth opportunities. In addition, bank affiliation (syndicate size) has a statistically significant negative (positive) impact on PE (VC) cash corporate reserves. I present evidence that financial constraints have a significantly negative impact on VC firms' cash reserves, however, VC investors' post-IPO ownership allows financially constrained firms to hoard cash. In addition, this paper reports that monitoring of cash holdings by PE sponsors leads to higher long-run stock returns of IPOs. Overall, my findings suggest that PE and VC investors are effective, active, post-IPO monitoring agents who are intensively involved in shaping firms' corporate policies. This, in turn, leads to superior long-run stock performance.

5.2 Implications

This dissertation contributes to the importance of fully understanding the heterogeneity in financial sponsors' investment, monitoring, supporting and divestment decisions. Prospective investors in private equity usually consider financial sponsors' track record in their decision to which PE and VC house to commit their capital. However, results of this dissertation provide a great incentive for limited partners to consider other factors as well. For example, limited partners' willingness to wait for distributions following an exit conducted by PE and VC funds. The market of quotation of a portfolio firm chosen by financial sponsors have an impact on the proportion of shares financial sponsors are required to retain in the post-flotation period. For example, in US IPOs financial sponsors are required to retain significantly more shares than in UK flotations, which reduces the proportion of realized returns at the IPO date. Certain types of PE/VC funds pursue a more strict monitoring style by having larger boards of directors, and minimizing spending when financial sponsors'

monitoring abilities are constrained, while others prefer their portfolio firms to hold significantly higher or lower proportion of assets in cash.

From the general partners' prospective, I present evidence that depending on the fund's age and how close it is to the termination date, some funds should carefully consider the market of quotation. In the US, general partners of funds close to their termination might find it beneficial to attract more institutional shareholders pre-flotation because investment banks tend to impose lighter lockup clause in such companies. Also, investment banks take into consideration the proximity of the portfolio firm to PE/VC fund in their decision as to how many shares financial sponsors retain compulsory.

Potential, outside investors in backed IPOs should be aware of the great influence financial sponsors continue to exert in the post-IPO period despite having other block holders. PE and VC investors are heavily and actively involved in defining the firm's corporate policies, which have a significant effect on firm value. The results suggest that financial sponsors are able to create value in firms even post-flotation. Other block holders may consider taking on a more active monitoring style in IPOs which are located in another country than PE and VC funds' headquarters.

High corporate cash reserves are generally viewed unfavorably by the market and outside investors. However, I demonstrate that it should not be the case for financially sponsored IPOs with continued financial sponsors' ownership. As a result of high proportion of unrealized returns, financial sponsors are incentivized and able to effectively monitor corporate cash reserves, which results in the positive effect on the long-run performance. Hence, activist investors might not add as much value to these firms since financial sponsors are effective monitoring agents. This dissertation contributes to the literature on increasing US corporate cash reserves by showing that

financial sponsors contribute greatly to this phenomenon. In sum, the market should acknowledge that PE and VC investors are catalysts of good corporate governance, who are able to create value in firms even in the post-flotation period.

5.3 Limitations and Future Research

As in any research, this dissertation has several limitations and the extent to which my results will be altered or strengthened is subject to further research. A more comprehensive ownership dataset (in terms of frequency) would allow me to examine PE and VC investors' ownership adjustment made on the exact date of lockup expiration. I believe that this would not have a material impact on results because Chapter 2 examined ownership adjustments made in first ownership quarter post the unlock day (as opposed to an exact lockup expiration date), which only would overstate PE and VC investors' propensity to conduct an exit.

My analysis concentrates on one type of divestment route taken by PE and VC investors. While it is important to examine IPOs backed by these financial sponsors because of their potential influence on corporate policies, other divestment routes are also worth analysing since it is not clear whether PE/VC fund and syndicate characteristics have a material impact on the propensity to divest and their monitoring styles in firms exited by other divestment routes. Moreover, I concentrate on recently quoted firms, and, as a result, not all my findings can be generalized to all public firms. One could have a detailed examination of a more mature sample, i.e. firms which have been quoted for longer than four years.

Finally, it can prove fruitful to examine whether my findings also apply to other markets of quotation, outside the US. For example, Western European counties provide a distinctive environment characterized by more concentrated ownership and

a different level of activism for corporate control. Nevertheless, I hope this dissertation highlights the importance of PE and VC financing, as well as provides powerful motivation for academics and practitioners to build on the findings presented in the three empirical studies.